TMS2002

131st Annual Meeting & Exhibition

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February 17-21, 2002 • Seattle, Washington

BRINGING ENERGY TO THE METALS AND MATERIALS COMMUNITY THROUGH INFORMATION EXCHANGE

Draw ***POWER*** from more than 160 technical sessions

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ADVANCE BROCHURE

Advances in Metallic Glasses
The purpose of this symposium is to discuss the latest advances in the field of metallic glasses. Topics will include all aspects of theory, experiment, and applications in new developments in this field. Particular areas of interest include glasses that crystallize as nanostructured composites, and bulk metallic glasses. *Sponsored by: Electronic, Magnetic & Photonic Materials Division.*

Advances in Molten Salt Processing Technology
Advanced molten salt processing methods are being developed for new metals production technologies, hazardous waste treatment methods, and the processing of spent nuclear fuels. These varied applications use halide salts as a common technology base for pyrochemical and electrometallurgical processes. This symposium will discuss the most recent developments in molten salt processing technologies in iodide, chloride, and fluoride salt systems. Abstracts are solicited for papers that describe research and results from experimental development through advanced application demonstrations. *Sponsored by: Light Metals Division, Reactive Metals Committee.*

Alumina and Bauxite
Papers addressing all aspects of the Bayer Industry are sought for the Bauxite and Alumina sessions: from bauxite through to alumina quality; from analytical methods through to process control; from theoretical aspects to operational issues. Also papers that relate to improvements to the safety and the integrity of the Refineries through design, maintenance procedures and alternative materials are encouraged. The increasing focus on environmental issues, in particular greenhouse emissions and residue disposal, are areas where the Industry needs to be continually aware and seek opportunities for improvement. Papers in these areas are keenly sought. There is a minimum standard of content, clarity and style to be met by all papers; we will assist wherever possible in this regard. Papers of a commercial nature will not be considered. **(Please contact TMS for presentation of marketing information at the Commercial Mini-Sessions.)** *Sponsored by: Light Metals Division, Aluminum Committee.*

Aluminum Reduction Technology
The Aluminum Reduction Technology sessions address all aspects of primary aluminum production technology. Suggested topics are technical innovations, cell design, performance improvements and operating advances. Papers are encouraged on retrofitting and expansion, productivity improvements, modeling and simulation of cells and potrooms, pot control techniques and sensors, inert anodes, as well as environment aspects and emissions. Further subjects of interest are fundamental studies, new processes, materials performance, anode phenomena, bath chemistry, magnetohydrodynamics, heat balance, and cell dynamics. *Sponsored by: Light Metals Division, Aluminum Committee.*

Aluminum Sheet and Plate Rolling & Finishing Technology and Applications
The sessions of the symposium will be aimed at personnel in the fields of metallurgy, engineering, maintenance, production, quality and management from end product manufacturers as well as aluminum producers and equipment suppliers. It is anticipated that individual sessions will cover topics such as sheet, plate and foil processing, rolling, gauges, surface inspection and finishing operations. It is anticipated that papers will be presented by speakers/companies from around the world. *Sponsored by: Light Metals Division, Aluminum Association.*

Automotive Alloys 2002
Automotive Alloys 2002 symposium is inviting papers to capture the ongoing research, development and testing activities for usage of aluminum and magnesium alloys in automotive applications. *Sponsored by: Light Metals Division, Aluminum Association.*

Carbon Technology
Programming for several sessions will cover anode (both prebaked and soderberg) and cathode operations as they relate to the aluminum industry. This includes raw materials, paste and green anode manufacture, anode baking, anode rodding, as well as all cathode operations. Also there will be a joint session with Reduction Technology on anode performance in cells. All aspects as they relate to properties, analytical procedures, and operations will be included. Papers should avoid any commercialism and must contain substantial new findings or reinterpretations of interest for the aluminum industry. *Sponsored by: Light Metals Division, Aluminum Committee.*

Cast Shop Technology
Broad-based scientific and engineering papers in the following areas are sought for incorporation in our Cast Shop technical sessions: charge materials, pre-furnace treatment, recycling, melting and melt preparation, dross processing, melt loss, alloying, grain refinement, fluxing, filtration, ingot and shape casting, continuous processing for all shapes (including strip and slab casting), process modeling and control, automation, cast structures, safe melt handling practices, and environmental issues. *Sponsored by: Light Metals Division, Aluminum Committee.*

Charles J. McMahon Interfacial Segregation and Embrittlement Symposium
Nature and driving force for Interfacial Segregation, Temper Embrittlement (Embrittlement in steels due to heat treatment), Segregation and Embrittlement in high temperature alloys due to service exposure, Embrittlement due to weld thermal cycles, Reheat cracking, Weld sensitization, Segregation resulting in enhanced corrosion and SCC, Irradiation induced segregation and resulting SCC, Impact on fracture, Fracture mechanics and fatigue, Segregation to other than grain boundaries, and its influence on properties, Computer modeling of segregation and the resulting embrittlement. *Sponsored by: ASM International: Materials Science Critical Technology Sector, Structural Materials Division, Materials Processing & Manufacturing Division, Jt. Mechanical Behavior of Materials, Jt. Computational Materials Science & Engineering, Texture & Anisotropy Committee.*

Commercial Mini-Sessions
Intended for short technical/product presentations of a commercial nature. Preferences will be given to contracted exhibitors and referrals from specific Program Chairpersons. Four sessions will be organized. The papers of the commercial mini-sessions will not be published in the Light Metals 2002 Proceedings. *Sponsored by: Light Metals Division, Aluminum Committee.*

THE ENTIRE PROGRAM, including abstracts, will be available beginning in November on the 2002 TMS Annual Meeting & Exhibition World Wide Web site at http://www.tms.org/Meetings/Annual-02/AnnMtg02Home.html. The program will also be published in the November issue of JOM.

SYMPOSIA HIGHLIGHTS

Computational Modeling of Materials, Minerals & Metals Processing

(Originally scheduled as the 2001 TMS Fall Extraction & Process Metallurgy Meeting)

Materials, metals and minerals processing technologies are very complex and demand a fine balance of many competing mechanisms. The only really effective way to design, analyze and optimize these processes is through the development and exploration of computational models. Such models have to reflect all the components, physics and chemistry and their interactions — plus the engineering constraints with respect to materials, what can be implemented, etc. Increasingly computational modeling (CM) is the means by which all the factors that effect the operation of a process can be analyzed in a rational manner. Such models also represent the framework within which we can embed much of our understanding of process operations. The objective of this international conference is to bring together all those who are involved in computational modeling of materials, minerals and metals processing. Also involved are the engineers involved primarily in specific applications, developers of CM tools, and the developers of models. Their parameterization and validation, and particularly those involved in commissioning such work, so that they may understand where the state of the art is in this rapidly developing enabling technology at the beginning of the new millennium. The meeting will be a mixture of invited, contributed and poster sessions with a couple of focused round table discussions on where and how CM technology needs to develop over the next decade. *Sponsored by the Extraction & Processing Division and the Materials Processing & Manufacturing Division.*

Computational Phase Transformations

This is the first of a series of annual TMS symposia focusing on the computational thermodynamics and kinetics of phase transformations. Its main objective is to bring together computational materials scientists to assess the current status of computational thermodynamics and kinetics, and discuss the possibilities of integrating models at different time and spatial scales as applied to phase transformations and the accompanying microstructure evolution. The computational models that are of interest include, but are not limited to, phase equilibria calculations using first-principles and CALPHAD approaches, and dynamic simulations using one or more of the following: Monte-Carlo, microscopic master equations, phase-field models, as well as models based on traditional sharp-interface descriptions. Of particular interest are computational models that integrate two or more different approaches and analyses that compare two or more different approaches, involve simulations with experimental verifications, and discuss the applications and limitations of a particular computational model. Six sessions are anticipated with a number of invited speakers for each session. *Sponsored by: ASM International: Materials Science Critical Technology Sector, Electronic, Magnetic & Photonic Materials Division, Structural Materials Division, Chemistry & Physics of Materials Committee, Jt. Computational Materials Science & Engineering, Thermodynamics & Phase Equilibria Committee.*

Creep Deformation: Fundamentals and Applications

The overall focus of the symposium is on the application of fundamental creep research to the design and development of high temperature materials for engineering applications. Papers are sought on all aspects of creep deformation and high temperature materials development. We particularly seek papers dealing with the influence of microstructures on various aspects of creep and the application of this information in the design of highly creep resistant materials. The sessions on fundamental behavior will be organized in honor of Professor Amiya K. Mukherjee. The purpose of this symposium is to bring together researchers working on fundamental issues relating to the development and characterization of high temperature materials and design engineers involved in high temperature applications. *Sponsored by: ASM International: Materials Science Critical Technology Sector, Materials Processing and Manufacturing Division, Structural Materials Division, Jt. Mechanical Behavior of Materials, Powder Metallurgy Committee.*

David L. Davidson Symposium on Fatigue

High-cycle fatigue has become a major concern in the design and lifting of engineering components and structures. This concern has led to increased research activities in high-cycle fatigue, including basic understanding of failure mechanisms; development of new experimental techniques, analysis methods, and life-prediction methods; evaluation of high temperature service conditions; and design of alloys and microstructures for fatigue. The proposed symposium is intended to capture the current research activities and to assess the state-of-the-art in the high-cycle fatigue arena. Examples of what might be presented during the proposed sessions are (1) basic understanding of failure fatigue mechanisms, (2) experimental methods and studies, (3) modeling and simulation, (4) life-prediction methodology, (5) fatigue of high-temperature alloys, and (6) material design for fatigue resistance. The proceedings will be published as a TMS book. This symposium is organized in honor of Dr. David L Davidson who has made very significant contributions in fatigue, and retired from Southwest Research Institute in February 1999, after thirty years of service. *Sponsored by: Structural Materials Division, ASM International: Materials Science Critical Technology Sector, Jt. Mechanical Behavior of Materials, and High Temperature Alloys Committee.*

Deformation and Stresses in Small Volumes

This symposium will focus on the mechanical properties, stresses, and deformation of materials that have at least one representative dimension in the micron or sub micron length scale. In these materials, such as thin films for microelectronics, wear resistant coatings, or nanostructured composites, deformation and fracture can be detrimental, leading to system failure or advantageous, showing greatly enhanced mechanical properties over the bulk state of a material. Papers related to stresses and deformation in thin films, thin film fracture and adhesion, deformation of multilayered materials and nanostructured composites, and advanced and novel testing methods for these materials are sought. Submission of papers addressing the implications of mechanical deformation on electronic and optical materials is encouraged. *Sponsored by: ASM International: Materials Science Critical Technology Sector, Structural Materials Division, Jt. Mechanical Behavior of Materials.*

Engineering Criteria 2000: Experience and Practice

A forum for Materials Engineering programs to present and discuss their experiences with Criteria 2000 from both the ABET visitor prospective as well as the program perspective. *Sponsored by: Education Committee.*

Fatigue and Creep of Metal Matrix Composites

Contributions to the broad area of fatigue and creep of metal matrix composites are solicited. Particle, short fiber, continuous fiber, reinforced in composites will be covered including laminates and layered materials. The relationship between processing, structure, and fatigue and creep properties and mechanisms is the focus of this symposium. *Sponsored by: Structural Materials Division, Jt. Composite Materials Committee.*

Fly Ash: Generation, Treatment, Metal Recovery and Disposal

Many kinds of fly ash are produced; municipal incineration plants, coal-burning electric power stations, pyrometallurgical and other metal processing plants. Fly ash often contains volatile metals such as Zn, Pb, Cu, Cd and others, which should be recovered. At the same time the recovery of metals leads to removal of harmful materials from fly ash. The session will cover the above topics and related areas. *Sponsored by: Extraction & Processing Division, Waste Treatment & Minimization Committee.*

Fundamentals of Advanced Materials For Energy Conversion

The scope of this symposium will be to bring together researchers in the fields of materials related to energy conversion. The focus will be on recent advances made in conversion, storage, and transmission of energy. The emphasis will be on fundamentals and applications of the above-mentioned topics. The symposium sessions will include: Fuel Cells, Hydrogen and Tritium Storage, Batteries, Superconductors, Magnets, Membrane Materials, Thermal Energy Storage Materials, Photovoltaics, and others. *Sponsored by: Extraction & Processing Division, Process Fundamentals Committee.*

Fundamentals of Structural Intermetallics

This symposium will deal with advances made in the fundamental understanding of structural intermetallics including aluminides (Ti-base, Fe-base, Ni-base), refractory-metal silicides (Nb-base, Mo-base, etc.), advanced intermetallics, intermetallic composites, shape-memory intermetallics, and others. Topic areas to be covered will include: physical metallurgy, alloy development, mechanical behavior & mechanisms, environmental resistance, melting & ingot production, casting, extrusion, forging & rolling, joining & fabrication, machining, powder metallurgy and novel processes. All aspects understood via experimental and/or analytical approaches are to be discussed along with modeling & simulation. Papers will be published in Metallurgical & Materials Transactions A through a stringent review process. *Sponsored by: ASM International: Materials Science Critical Technology Sector, Structural Materials Division, Jt. Mechanical Behavior of Materials.*

General Abstracts

The TMS Annual Meeting Programming Committee invites you to make plans now to present your research as part of its extensive program of general abstract sessions. In an effort to present a more comprehensive view of current work being carried on in materials science research and industry, particularly new and emerging technologies and techniques, TMS is soliciting general abstract submissions for sessions related to the following areas: alloy phases, aluminum, chemistry and physics of materials, composite materials, corrosion and environmental effects, electronic packaging and interconnection materials, polymers, powder metallurgy, precious metals, processing fundamentals, reactive metals, recycling, refractory metals, shaping and forming, solidification, superconducting materials, surface engineering, thin films and interfaces. *Sponsored by: TMS.*

General Poster Session

A technical, noncommercial poster session will be held in conjunction with the Annual Meeting. Presentations will be displayed on 4x8-foot poster boards; no formal presentation is required. Individuals should refrain from the use of brand names and specific product endorsements. The Poster Session will begin on Monday and remain in place through Wednesday.

General Pyrometallurgy

General topics in pyrometallurgy, covering the science, technology, and industrial practice of the processing of non-ferrous metals from their ores and or secondary sources by pyrometallurgical means, and their forming into semi-finished, or finished products. Submit abstracts to http://cms.tms.org. *Sponsored by: Extraction & Processing Division, Pyrometallurgy Committee.*

General Topics in Waste Treatment and Minimization

This symposium will address pertinent topics in waste treatment and minimization, with subjects Recycling Refractories and Process Mineralogy. *Sponsored by: Extraction & Processing Division, Process Mineralogy Committee, and Waste Treatment & Minimization Committee.*

High Performance Metallic Materials for Cost Sensitive Applications

High performance structural materials are used in an ever-increasing array of products that are highly cost-sensitive. These cost-sensitive applications span several industries, including automobile, aerospace, energy production, and consumer products industries. In order to maintain competitiveness, improved materials and processing technologies are critical to maintaining high performance while reducing acquisition and life cycle costs. For example, titanium has continued to be one of the most costly, but widely-utilized, high performance metallic materials for which cost reduction is of critical importance. Aluminum alloys have made significant inroads into automobile manufacturing thanks in large part to acquisition cost reductions and greater efficiency in processing and forming technologies. This symposium will examine recent advances and best practices in structural materials selection, design, and manufacturing for producing affordable components, emphasizing titanium, aluminum, and other advanced metallic materials. Focal areas include melting, casting, powder metallurgy, forging, forming, extrusion, and machining. Topics of particular interest include processing advances, innovative processing techniques, process modeling and materials by design, new alloys as well as related processing-microstructure-properties-performance-cost studies. Written papers are solicited to be published as proceedings. *Sponsored by: Structural Materials Division, Structural Materials Committee, and Titanium Committee.*

Hume-Rothery Award Symposium: CALPHAD and Alloy Thermodynamics

This symposium held in honor of the 2002 Hume-Rothery Award recipient, Dr. Larry Kaufman, will emphasize all theoretical aspects of computational thermodynamics and kinetics, and their impact on the science of alloys and materials design. All participants are invited speakers, and have been asked to review important subjects in the field. Specifically, this symposium will provide an assessment of the CALPHAD approach pioneered by Larry Kaufman, a current status of the software applications based on the CALPHAD approach and their range of applicability, the impact of CALPHAD on alloy thermodynamics and design, and future prospects. *Sponsored by: Electronic, Magnetic & Photonic Materials Division, Structural Materials Division, and Alloy Phases Committee.*

Imaging of Dynamic Processes

New experimental techniques and devices for capturing visual images have permitted development of enhanced understanding of dynamic processing operations. These will be reviewed along with the understanding that has been created. *Sponsored by: Extraction & Processing Division, Materials Processing & Manufacturing Division, and Jt. Processing Modeling Analysis & Control Committee.*

International Symposium on Science and Technology of Interfaces in Honor of Dr. Bhakta Rath

The objective of this symposium is to present current research and developments on interfaces in a variety of materials ranging from advanced nanostructured materials to high Tc superconductors. Special attention will be paid to the effects of interfaces on the unique, highly desirable properties of these materials; as well as their applications. The symposium aims to assess the current status and to identify future directions of R&D in these materials. Special focus will be on the following topics: synthesis and processing; modeling; characterization & properties. *Sponsored by: Structural Materials Division, ASM International: Materials Science Critical Technology Sector, Electronic, Magnetic & Photonic Materials Division, Physical Metallurgy Committee, Superconducting Materials Committee, Jt. Mechanical Behavior of Materials, Titanium Committee.*

Lead-Free Solders and Materials Issues in Microelectronic Packaging

The focus of this symposium will be on emerging and established lead-free and lead-bearing solders, metallizations (board and component finishes) and various materials issues, including soldering processes for electronic, optical/optoelectronic and MEMS packaging. This symposium will address the materials and manufacturing aspects of alloy design of solders, structure-property-processing relationships of bulk solders as well as solder joints, influence of surface and underbump metallization on solderability and reliability of solder joints, microstructure modeling and control, reliability modeling and testing methodologies of electronic, MEMS and optical/optoelectronic packages. The symposium will also cover lead-free materials for metal-semiconductor contacts, alternative interconnect technology for stress management at both wafer-level and chip to package level, and the issues involved in the design and integration of conductive adhesives in electronic packages. Topics related to lead-free soldering in optoelectronic and microelectronic packages, such as BGA, micro-BGA, chip-scale etc. are also of special interest. *Sponsored by: Electronic, Magnetic & Photonic Materials Division, Electronic Materials Committee, Electronic Packaging and Interconnection Materials Committee.*

Magnesium Technology 2002

The scope of the conference will deal with all aspects of magnesium technology, from production and mining to part manufacturing technology and on to physical and mechanical and corrosion properties of new and existing magnesium alloys. The list of session topics should be as follows (subject to further suggestions by the committee): Fundamentals of Magnesium production-Electrolytic or Thermal; Materials for Magnesium production; Magnesium Cast House technology, casting and solidification; Environmental issues; Magnesium recycling/cover gas issues; Alloy development: Structural, Thixo and Wrought alloys, high temperature alloys; Corrosion, cathodic protection, corrosion resistant alloys and coatings; Alloy properties and new applications; Magnesium and the automotive industry; Magnesium R&D needs. *Sponsored by: Light Metals Division, Magnesium Committee, and International Magnesium Association.*

Materials Processing Fundamentals

This symposium will cover all aspects of the fundamentals, synthesis, analysis, design, monitoring, and control of metals, materials, and metallurgical processes and phenomena. Topics include the experimental, analytical, and computer-modeling aspects of the physical chemistry, thermodynamics, and transport phenomena in materials and metallurgical processes as well as monitoring and control methodologies involved in these processes. Research relating to processes involving iron and steel, nonferrous metals, or lightweight alloys and topics that relate to process monitoring and control involving laboratory and in-plant validation are especially encouraged. *Sponsored by: Extraction & Processing Division, Process Fundamentals Committee.*

Materials & Processes for Submicron Technologies - II

Advances in microelectronic devices are directly related to the reduction in size of the electronic devices and interconnections down to the submicron size. The purpose of the symposium is to provide an interactive forum of multidisciplinary discussion on the science and technology of advanced materials and processing issues in microelectronic device fabrication. Specific topics include, but are not limited to: · Advanced Metallization: new materials and processes for metallization and interconnects, deposition kinetics, film properties related to performance, process control and integration· Advanced Dielectrics: new organic and inorganic dielectrics, low-dielectric constant materials· High-K Materials for Gate Dielectrics: processing and characterization of barium strontium titanate, tantalum pentaoxide, titanium oxide, oxides of hafnium and zirconium, etc.· Chemical Mechanical Polishing: CMP theory, modeling and simulation, parametric analysis of polishing sensitivities and integration of CMP into process flow· Silicides: formation kinetics and stability of silicides phases, silicide processing, process integration , and next-generation silicide technology· Silicon Contact Technology: barrier processing, metal fill processes, and process integration for high-aspect ratio contacts and shallow-junction devices· Reliability Issues: gate dielectrics, electromigration in contacts and substrates· Integrated Processing: sequential multichamber processing, real time monitoring, ultraclean processing, low temperature epitaxy· Materials and Device Characterization: Novel, non-contact approaches, end-point detection, device modeling and related topics. *Sponsored by: Electronic, Magnetic & Photonic Materials Division, Thin Films & Interfaces Committee.*

Modeling of High Temperature Alloy Processing

The symposium focuses on the modeling of processing of high temperature alloys (titanium and nickel based alloys in particular) from melting and solidification through deformation and heat treatment. We are interested in submissions on predictions of transport phenomena, deformation and residual stress, and/or microstructural development during processes such as casting, remelting and refining (ESR, VAR, PAM, EBM), heat treatment, rolling, incremental forging, hot-die forging, flow-forming, HIP, and powder processing. *Sponsored by: Materials Processing and Manufacturing Division, Jt. Processing Modeling Analysis & Control Committee, Shaping and Forming Committee, Solidification Committee.*

Modeling of Multi-Scale Phenomena in Materials Processing

The purpose of the symposium is to provide a forum for the representation of current activities and new ideas in the development of computational techniques for the modeling of multi-scale phenomena in materials processing. The submitted papers should address the new application of conventional techniques or new, more efficient, numerical methods for the solution of problems that involve multiple-scale phenomena. Papers on experimental studies that can support the advancement of such methods are also welcomed. Typical topics may include solution algorithms for coupling of models that describe microscale and macroscale phenomena, deterministic and stochastic models, phase field simulations, direct numerical simulations of microstructure and fluid dynamics effects. In addition to theoretical studies, experimental efforts that generate data to validate the models are encouraged; as are applications of these techniques to solve relevant problems, especially by industrial investigators. Topics may pertain to phenomena related to any material or metallurgical process. *Sponsored by: ASM International: Materials Science Critical Technology Sector, Materials Processing & Manufacturing Division, Jt. Computational Materials Science & Engineering, Solidification Committee.*

Phase Stability, Phase Transformations & Reactive Phase Formation in Electronic Materials

This symposium addresses phase stability, phase transformation, and reactive phase formation issues in electronic materials. Topics of interest include, but are not limited to, phase stability of flip-chip UBM, interfacial reactions at solder joints, phase transformations in lead-free solders during the soldering process, dimensional stability of solder joints in optoelectronics, phase transformations in silicide materials, phase stability of contacts and interconnects in ICs, new barrier layers for Cu processes, self-assembled quantum dots, multicomponent III-V materials, and chemical interactions between electronic materials. Papers on experimental and theoretical investigations of related topics are all welcome. *Sponsored by: Electronic, Magnetic & Photonic Materials Division, Structural Materials Division, and Alloy Phases Committee.*

Processing and Properties of Lightweight Cellular Metals and Structures

Cellular metals and designed porous structures are attractive lightweight structural materials with potential applications in automotive, aerospace, electronics and other industry. Such materials as metal foams, sponge-like metals as well as periodic geometry core structures, e.g. trusscore, honeycomb, hollow sphere, triangular core, etc. are being increasingly considered a solution for problems of light-weight construction, heat exchangers, passive safety, sound damping, filtering, thermal stability and other purposes. Other cellular structures are designed and built per mathematical design methodology to yield uncommon properties. A number of companies are involved in manufacturing such materials and evaluating their properties, and possible applications of cellular metals for a variety of purposes. Modeling of thermal effects, deformation and other characteristics have also made steady progress. This global symposium underscores the enthusiasm in this unique group of materials and structures. Abstracts from authors representing government, industry, and academia are invited in the following areas: (i) design concepts and functional properties, (ii) processing technologies, (iii) microstructure and property characterization, (iv) modeling of properties, (v) component fabrication, and (vi) applications and investments. *Sponsored by: Materials Processing and Manufacturing Division, Shaping and Forming Committee.*

Processing of Refractory Metals and Alloys

This symposium will encompass all aspects of processing of refractory metals and alloys. Of special interest are melting practices, powder metallurgy, alloying methods, thermomechanical processing, and texture development. Engineers working on refractory metals for new applications such as electronic, thermal, structural, or chemical processing are also strongly encouraged to submit abstracts. Both experimental and modeling based papers are appropriate, as are papers that apply new techniques that characterize the microstructure and properties of the processed material. *Sponsored by: Structural Materials Division, Refractory Metals Committee.*

Recycling — General Sessions

Sessions will cover innovative research work, advances in ongoing research, and general industrial practices from recycling of materials. Reports of work in other fields, including optimization of physical, aqueous, and thermal processing of scraps and waste; environmental and economic impacts; material selection and design based on recyclability; life-cycle analysis of materials; properties; and applications of recovered materials are welcomed. *Sponsored by: Extraction & Processing Division, Light Metals Division, Recycling Committee.*

Second International Symposium on Ultrafine Grained Materials

This is the second international symposium that focuses on all aspects of science and technology of bulk ultrafine-grained (UFG) materials produced by Severe Plastic Deformation (SPD) techniques. Recently, there have been increasing R&D activities in this area because of the potential of the SPD techniques in producing clean and fully dense, bulk UFG materials for scientific explorations as well as practical structural and functional applications. This symposium provides a forum on the areas of processing and microstructures, microstructural evolution, mechanical and physical properties, superplasticity, computational and analytical modeling, new SPD technologies and advances, etc. A proceedings book will be available at the meeting. *Sponsored by: Materials Processing & Manufacturing Division, Shaping and Forming Committee.*

Shear Banding in Materials

Shear banding is a dominant failure mode in many advanced materials, such as metallic glasses, nanostructured metals, amorphous polymers, and structural metals (including high strength aluminum alloys). A fundamental understanding of shear band mechanisms is necessary to control the phenomena, and to continue the technological development of these materials. This symposium seeks to explore the similarities and differences in shear banding behavior within these different material classes. Experimental, theoretical, and modeling studies are all welcome. *Sponsored by: ASM International: Materials Science Critical Technology Sector.*

Surface Engineering: Science & Technology II

The symposium will address the scientific issues related to Surface Engineering phenomenon in synthesis, characterization, and application for all materials. The objective of the symposium is to provide a multidisciplinary discussion on surface related phenomena by which materials performance may be enhanced through engineered interfaces and surface modification technologies. *Sponsored by: Materials Processing & Manufacturing Division, Surface Engineering Committee.*

Teaching and Learning Hydrometallurgical Science and Engineering

The focus of this symposium is teaching and learning in hydrometallurgy science and engineering. The goal is to bring together people from academia and industry to discuss the issues involved in educating students in hydrometallurgy. It is hoped that there will be a strong international representation. The sessions will be organized to help bridge the gap between universities and industry, with the hope that each will help the other to improve current teaching approaches. Two special sessions are planned. One will be a panel discussion involving professors, industry professionals and students on how industry and academia can work together to better educate hydrometallurgists. The other session will involve short presentations followed by demonstrations of the many types of instruction technology, both academic and commercial, which are available. Other possible sessions topics include: Distance/on-line learning and education; From university to the plant: Industrial perspective; Environmental hydrometallurgy; Teaching and learning on the fly; Incorporating process economics/plan design in courses; Industry-University partnerships for research; and Internships and cooperative education. *Sponsored by: Extraction & Processing Division, Aqueous Processing Committee, Copper, Nickel, Cobalt Committee, Precious Metals Committee, and Waste Treatment & Minimization Committee.*

Third International Sulfide Smelting Symposium: "Sulfide Smelting '02"

This symposium will focus on all aspects of the pyrometallurgical production of primary metals from sulfide concentrates. Papers describing industrial operations producing copper or nickel as well as the direct production of lead or zinc are encouraged. Some key areas to be explored are smelting and/or converting processes, recently completed capital projects, current operating practices, the predicted future of sulfide smelting operations, furnace integrity and refractory design, gas handling processes and equipment, issues related to the treatment of high strength sulfur dioxide-containing off-gases, the production of alternative sulfur products, the treatment of acid plant blowdown streams and sulfated smelter dusts, and the capture and treatment of fugitive emissions. *Sponsored by: Extraction & Processing Division, Pyrometallurgy Committee.*

Water Vapor Effects on Oxidation of High-Temperature Materials

Water vapor is a constituent in combustion and other high-temperature environments. Its influence on high-temperature corrosion and environmental effects has long been recognized, but, over the past few years, various effects of water vapor on the degradation of metallic and ceramic materials have drawn increasing intense scientific and technological interest. Accordingly, this symposium will serve as a forum for investigators studying effects of water vapor on high-temperature oxidation in order to understand underlying mechanisms and predict material performance under a variety of environmental conditions (low to high water vapor concentrations/pressures, temperature cycling, influence of other reactive species, etc.). Papers describing work with metals/alloys as well as ceramics will be included. A post-symposium proceedings volume is planned. *Sponsored by: ASM International: Materials Science Critical Technology Sector, Structural Materials Division, Corrosion and Environmental Effects Committee.*

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2002 TMS Annual Meeting & Exhibition

Monday-February 18		Tuesday-February 19		Wednesday-February 20		Thurs.-Feb. 21	
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GA Joining, Testing and Characterization	GA Al and Ti	Imaging of Dynamic Processes I	Imaging of Dynamic Processes II	Modelling of High Temperature Alloy Processing			310
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2002 TMS Annual Meeting & Exhibition

	Monday-February 18		Tuesday-February 19		Wednesday-February 20		Thurs.-Feb. 21
	AM	PM	AM	PM	AM	PM	AM
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608			Cast Shop IV		Aluminum Sheet & Plate Rolling & Finishing Technology & Applications I	Aluminum Sheet & Plate Rolling & Finishing Technology & Applications II	Aluminum Sheet & Plate Rolling & Finishing Technology & Applications III
609	Alumina & Bauxite I	Alumina & Bauxite II	Alumina & Bauxite III	Alumina & Bauxite IV	Alumina & Bauxite V	Third International Sulfide Smelting Symposium: "Sulfide Smelting '02" VII	
611		Automotive Alloys I	Automotive Alloys II	Automotive Alloys III			
612		Lead-Free Solders and Materials Issues in Microelectronic Packaging I	Lead-Free Solders and Materials Issues in Microelectronic Packaging II	Lead-Free Solders and Materials Issues in Microelectronic Packaging III	Lead-Free Solders and Materials Issues in Microelectronic Packaging IV	Lead-Free Solders and Materials Issues in Microelectronic Packaging V	
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614	Advances in Molten Salt Processing Technology I	Advances in Molten Salt Processing Technology II	Materials Processing Fundamentals I	Materials Processing Fundamentals II	Materials Processing Fundamentals III	Materials Processing Fundamentals IV	Fundamentals of Advanced Materials for Energy Conversion VIII
615-616	Fundamentals of Structural Intermetallics I	Fundamentals of Structural Intermetallics II	Fundamentals of Structural Intermetallics III	Fundamentals of Structural Intermetallics IV	Fundamentals of Structural Intermetallics V	Fundamentals of Structural Intermetallics VI	Fundamentals of Structural Intermetallics VII
617	International Symposium on Science & Technology of Interfaces in Honor of Dr. Bhakta Rath I	International Symposium on Science & Technology of Interfaces in Honor of Dr. Bhakta Rath II	InternationalSymposium on Science & Technology of Interfaces in Honor of Dr. Bhakta Rath III	International Symposium on Science & Technology of Interfaces in Honor of Dr. Bhakta Rath IV	International Symposium on Science & Technology of Interfaces in Honor of Dr. Bhakta Rath V	International Symposium on Science & Technology of Interfaces in Honor of Dr. Bhakta Rath VI	International Symposium on Science & Technology of Interfaces in Honor of Dr. Bhakta Rath VII
619-620	Computational Modeling of Materials, Minerals and Metals Processing I	Computational Modeling of Materials, Minerals and Metals Processing II	Computational Modeling of Materials, Minerals and Metals Processing III	Computational Modeling of Materials, Minerals and Metals Processing IV	Computational Modeling of Materials, Minerals and Metals Processing V	Computational Modeling of Materials, Minerals and Metals Processing VI	Computational Modeling of Materials, Minerals and Metals Processing VII

The TMS 2002 Annual Meeting & Exhibition offers students, interested in materials science and engineering, a variety of opportunities to gather technical information, explore career possibilities, and network with students and professionals in the field.

Non-Member Students Receive a Free Year of TMS Membership!

Student members of TMS may attend the technical sessions, exhibits and lectures held Monday through Thursday on a complimentary basis. Registration for students who are not members is $25, which will be applied toward a TMS Student Membership in 2002.

4th Annual TMS Student Poster Session

This students-only Poster Session will be held in conjunction with the TMS 2002 Annual Meeting & Exhibition. Presentations will be displayed on 4' by 4' poster boards; no formal presentation is required. The Poster Session will begin Monday, February 18 and remain in place through Wednesday February 20. Annual Meeting attendees will have the opportunity to vote for the "Best Poster", with the winning poster receiving $500.

To enter, contact the TMS Member Services Department for a submittal form or visit the student pages of TMS OnLine. All forms must be received at TMS by December 14, 2001.

Student Travel Assistance

TMS Technical Division Student Travel Scholarships—This program sponsored by the TMS technical divisions can help pay your travel expense. Students receiving travel scholarships are responsible for making their own travel and hotel arrangements and registering for the meeting. To apply for travel assistance, send a letter of application and state why you wish to attend the 131st TMS Annual Meeting and Exhibition in Seattle, WA, by December 14, 2001. Name the TMS division in whose technical programming you are most interested, MPMD, SMD, or EMPMD, and include complete information on how you can be contacted. You must be a TMS student member to qualify. If we cannot contact you, your award will be forfeited. A subcommittee of the appropriate sponsoring division will review your letter and select the applicants to receive the travel scholarships. Those receiving travel scholarships will be contacted by TMS shortly after a decision is made.
Send letters of application to:
TMS, Attn: Tara Oprosky
184 Thorn Hill Road
Warrendale, PA 15086 USA
Fax: (724) 776-3770
E-mail: toprosky@tms.org

TMS Student Chapters—Don't forget to select a representative and submit the TMS Travel Reimbursement Program form, granting each chapter up to $500 per year to send student(s) to TMS conferences!

Graduate Students!

Attend the 5th TMS Graduate Student Leaders Program Meeting on Monday, February 18, in the Sheraton Seattle Hotel and Towers from 11:00 am -12:00 pm. Meet with members of the Student Affairs Committee and your peers to assist in the development of this TMS student program geared specifically toward graduate students. Attendance is limited to graduate students. Register in advance by January 21 to: Tara Oprosky, TMS Membership Coordinator, (724)776-9000, ext. 220, toprosky@tms.org

Student Session Monitors

Students will have the opportunity to partially defray their conference expenses by serving as session monitors. Monitors are responsible for assisting the session chair, recording session attendance, and assisting with audio/visual equipment. All monitors must report to Authors' Coffee each morning that they are scheduled to monitor sessions. Monitors positions are limited and will be assigned on a first-come basis. To obtain work forms and schedule, contact Charlotte Kobert, 724-776-9000, ext. 253, ckobert@tms.org. The deadline to submit completed work forms is January 15, 2002.

TMS Student Leaders Career Forum

Sunday, February 17, 2002 ..... 2:00 pm – 4:00 pm
Sheraton Seattle Hotel and Towers

Dr. Rod Guthrie, *McGill University*
Mr. Keith Poole, *Ispat Inland, Inc*
Dr. Mary Wells, *University of British Columbia*

Choosing and pursuing an appropriate professional career path, either industrial or academic, is the ultimate vision of any metals and materials student. How should you prepare to lay the groundwork for this transition into the professional world? The TMS Student Leaders Career Forum will address the many pertinent issues that face students today. The Forum will feature key figures from both academia and industry who have "been there and done that", and will provide personal insight on preparation strategies, and how to develop a rewarding career and quality of life that is both balanced and fulfilling. Speakers will also address personal dilemmas and apprehensions of participating students during an interactive session that will follow the presentations.

Student Faculty Mixer

Sunday, February 17, 2002 ..... 8:00 pm - 10:30 pm
Sheraton Seattle Hotel and Towers

Sponsored by the TMS Student Affairs Committee

The traditional TMS Student/Faculty Mixer is scheduled for Sunday evening, February 17, from 8:00-10:30 pm. Beer*, soft drinks, and snacks will be provided. This event is intended to welcome students to the TMS Annual Meeting, and all students and university faculty are invited to attend!

Display school pride! Everyone -even faculty!- is encouraged to display school pride by wearing school colors to this casual event.

Donate a door prize! Student Chapters are encouraged to use their creativity and donate an item as a door prize! TMS will also be donating items, with a grand prize surprise! The more prizes donated, the better your chance to win!

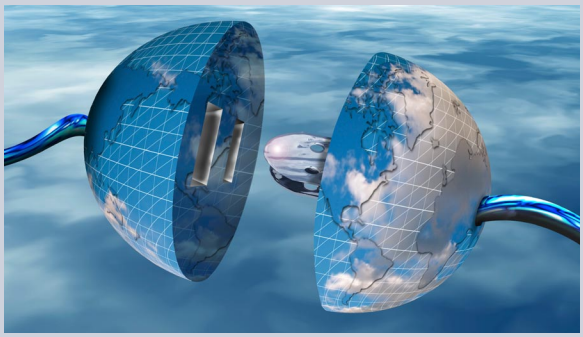
Dance and enjoy! The DJ will play the tunes, the beer will be flowing, and snacks will be all around! Come see old friends and make new ones!

**Note: In accordance with the Washington State Law, alcoholic beverages will be served only to attendees who are 21 years of age or older; proper photo ID with birth date must be presented upon entry.*

Watch your student chapter mail for further details.

ENERGY ISSUES IN THE ALUMINUM INDUSTRY

Presenting the most informative overview yet on the Northwest energy crisis and its current and future impact on aluminum production. Keynote presentations by the world leaders in the energy arena will include the following...



"The Perspective and Affects of Energy and Industry"

Brett Wilcox, *President and Owner, Golden Northwest Aluminum, Inc.*

For years, the aluminum industry and the Pacific northwest have maintained a mutually beneficial relationship based on the region's supply of suffucient and affordable electricity—until—power shortaged and subsequent increased pricing almost completely curtailed primiary aluminum production.

Brett Wilcox is President and Owner of Golden Northwest Aluminum, Inc., which owns and operates Northwest Aluminum Company, (an 82,000 metric ton per year primary aluminum smelter and state-of-the-art billet and forging stock producer in The Dalles, Oregon) and Goldendale Aluminum Company, (a 168,000 metric ton primary aluminum smelter near Goldendale, Washington). Brett also is Managing Member of Northwest Energy Development, LLC that is developing over 1000 megawatts of efficient natural gas and wind power generating projects to supply the Golden Northwest smelters. Brett also is active in a number of other real estate and business ventures.

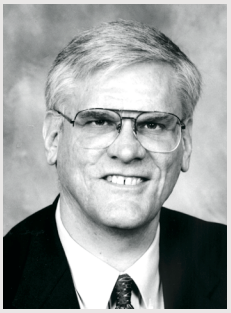
Prior to founding Northwest Aluminum Company in 1985, Brett was the Executive Director of Direct Service Industries, Inc., a trade association of large aluminum and other energy-intensive companies that purchased electricity directly from the Bonneville Power Administration. He also practiced as an attorney with Preston, Ellis and Gates in Seattle, Washington, concentrating on energy and business matters.

Brett graduated from Princeton University, with an A.B. degree in Public Affairs in 1975. He received his J.D. degree from Stanford Law School in 1978.

Brett is involved in numerous civic and charitable activities including Chairman of the Oregon Economic and Community Development Commission and Vice Chairman of the Oregon Progress Board. Brett also is a member of the Boards of Reed College, Citizens for the Columbia River Gorge Discovery Center, the Portland Art Museum, Bonneville Environmental Foundation, Oregon Business Council and Washington Business Roundtable. Brett previously was Chairman of the Oregon Trail Coordinating Council and a member of the Governors' Comprehensive Review of the Northwest Regional Power System, the Oregon Governor's Task Force and the Structure and Efficiency of State Government and the Governor's Task Force on Employee Benefits and Compensation.

Among his numerous awards and public activities are Glenn Jackson Leadership Award, the Bonneville Power Administrator's Award for Exceptional Public Service, Oregon Governor's Award for Statewide Economic Contribution, the first "Gold Schmidty Award" for contributions to Oregon, The Dalles Businessman of the Year Award, the U.S. Senate Productivity Award, the Council for Economic Development Award, and the Job Training Partnership Award.

"Dealing with the Energy Crises by Reducing Demand"



Paul E. Norman, *Senior Vice President, Power Business Line, Bonneville Power Association*

In April of 2001, BPA was faced with the possibility of raising wholesale rates to Northwest utilities and large industries by 250 to 300 percent. High market prices were the reason. BPA knew that it had to limit its exposure to the market if it was going to get the rate increase down to double digits. In less than two months, using an aggressive load reduction strategy, BPA — with the tremendous cooperation from the region and a major contribution from the aluminum industry — reduced the rate increase to 46 percent.

Paul E. Norman is Senior Vice President of the Bonneville Power Administration and heads its Power Business Line. Mr. Norman is responsible for the generation, marketing and sale of power. The Power Business Line produces revenues of about $2 billion per year from the sale of about 11,000 average megawatts of power.

His prior position was Vice President for Power Sales and Account Services. In that position, he was responsible for all power marketing, power rates, power billing, contracts and the three sales divisions — the Western Area Business Office, the Eastern Area Business Office and the Bulk Sales Office.

Before becoming the Vice President, Mr. Norman was Bonneville's segment manager responsible for all sales and contracts business with the Agency's large, public utility generating utilities. Among the utilities in this segment are Seattle City Light, Tacoma City Light, Eugene Water and Electric Board, etc.

Mr. Norman managed BPA's "Competitiveness Project" which lead to the Agency's first downsizing and its more customer-focused organization and policies. Before that, he managed the Agency's economic analyses for generating projects, including the mothballed Washington Nuclear Power plants 1 & 3 and the Trojan nuclear plant. He also managed the economic analyses of Bonneville's large energy conservation programs.

Mr. Norman also served as the Assistant Director of Power Supply for the Agency.

Prior to joining Bonneville in 1982, he was an economist with the U.S. Army Corps of Engineers working on various power, navigation and flood control projects in the Northwest.

A native of Maryland, Mr. Norman studied at the University of Vermont, University of Maryland and Western Washington University. He received a Bachelors Degree in Environmental Planning and did graduate work in economics at Portland State University.

"Aluminium and Energy - an international perspective"

Robin King, *Vice President Public Affairs, The Aluminum Association*

Energy represents about one third of the total production cost of primary aluminum. Electricity is an essential ingredient in primary aluminum production. These factors together make energy efficiency and energy management prime objectives for the industry.

The Aluminum Association supports efforts to create an effective national policy that resolves the power-shortage crisis in the Northwest while sustaining and protecting the regional aluminum industry - accounting for almost 40 percent of domestic primary production and 5 percent of world supply.

The Aluminum Association supports efforts to create an effective national policy that resolves the power-shortage crisis in the Northwest while sustaining and protecting the regional aluminum industry ñ accounting for almost 40 perfect of domestic primary production and 5 percent of world supply.

Robin R. King Mr. Robin R. King serves as Vice President Public Affairs for The Aluminum Association, Inc., the largest aluminum industry trade organization world wide, headquartered in Washington, D.C.

Mr. King directs government relations and communications programs supervising staff and consultants in media relations, congressional liaison, public relations, communications and publishing. He represents the association and aluminum industry for pertinent issues to trade groups including National Association of Manufacturers, U.S. Chamber of Commerce, and United States Council for International Business. Through these and other venues, the association advocates interests of aluminum producers, recyclers, and fabricators to U.S. and foreign governments, promoting global standards, industry data, health, safety, and environment. He serves as staff liaison to the Government & International Affairs Committee, the Can Marketing Committee, and the Communications Committee. He advises the president on issues, policies, and strategies pertaining to energy, packaging, transportation, trade and environment, and manages staff and committees in related activities.

Prior to the Aluminum Association, Mr. King directed public affairs and communications for the Nasdaq Stock Market and National Association of Securities Dealers from 1992-1999. The NASD/Nasdaq is the worldís largest securities regulatory organization and second-largest stock market headquartered in Washington, D.C. Mr. King raised focus on issues and programs pertinent to financial-market regulation, investor protection, company disclosure, and securities-firm compliance.

"Alternative Energy Solutions"

Richard Evans, *Executive Vice President, Alcan Aluminium Limited and President, Alcan Fabrication Group*

A review of the effects of regional energy and trade issues on the global aluminium industry and its markets and possible future international trends and scenarios.

Richard B. Evans is Executive Vice President of Alcan Aluminium Limited and President of the Alcan Fabrication Europe Group, one of Alcan's four business groups. In addition to his Fabrication Europe role, Mr. Evans is also responsible for the overall integration process between Alcan and algroup following the October 2000 merger. He is based at Alcan's European headquarters in Zurich, Switzerland.

Alcan's Europe Fabrication group serves many markets including automotive, building and construction, mass transportation, packaging and printing. The group has two sectors Rolled Products, which includes 11 facilities, and Engineered Products, which has 23 plants including extrusions, composites, automotive systems and components, mass transportation systems and sales and service centres. Annual revenues for Alcan Fabrication Europe are approximately $3 billion. The group employs 10,000 people in 34 countries.

Mr. Evans has an extensive background in general and executive management in the aluminum industry. He joined Alcan Aluminium Limited in January 1997, in Montreal as Senior Advisor, Corporate Development, following 27 years of employment with Kaiser Aluminum & Chemical Corporation in the U.S. and internationally. He was appointed Executive Vice President, Fabricated Products, North America, and President of Alcan Aluminum Corporation in July 1997, and President of Global Fabrication in March 1999 before moving to Europe in October 2000.

Mr. Evans serves as vice chairman of the European Aluminium Association, the Brussels based European trade association and is a past Chairman of the U.S. Aluminum Association's Board of Directors from 1997 to 1999. He is a director of the Alcan Deutschland Supervisory Board, CEO and Chairman of Alusuisse, and has previously served s a director and chairman of Logan Aluminum Inc., a joint venture in Kentucky, USA.

Mr Evans is a graduate of Oregon State University with a bachelor's degree in engineering and earned his master's in management from the Stanford University Graduate School of Business. He is a native of Oregon, USA. He and his wife, Gretchen, are the parents of two grown daughters.

"New and Emerging Technologies"

Jud W. Virden, Jr., *Automotive and Transportation Technology Manager, Energy and Technology Division, Pacific Northwest National Laboratory*

How quickly does science fiction become science fact? You may be surprised, especially with upcoming technologies to help increase your energy efficiency and reduce your energy usage. Jud Virden will speak on new and emerging technologies that will soon change where you could get your energy, how you will build your buildings and what will power your equipment. Hear about fuel cells for distributed power systems and automobiles, miniature technologies, smart appliances and more - the stuff of science fiction coming to you soon!

Dr. Jud Virden has been the Automotive and Transportation Technology Manager in the Energy Science and Technology Division of Pacific Northwest National Laboratory (PNNL) since 1999. In this position, he is responsible for programmatic activities with automotive customers and the Office of Transportation Technologies in the U.S. Department of Energy's Energy Efficiency and Renewable Energy Office. This includes the development of government-sponsored research with industry partners in the areas of advanced lightweight metal forming, fuel reformation, sensor development and advanced exhaust after-treatment devices. Current industry partners include Chrysler, Ford, GM, Delphi Automotive Systems, Visteon (Ford), Caterpillar, Detroit Diesel, PACCAR and Freightliner, ALCOA, and Reynolds Aluminum. Dr. Virden is also the Account Manager for Delphi Automotive Systems and is responsible for developing private business with Delphi Automotive Systems. Business activities have focused on partnering in the development of advanced technologies. Project areas have included, solid oxide fuel cells, exhaust sensors, nonthermal plasma for emission reduction, spark plugs, lead acid and lithium ion battery development.

From 1996 to 1999, Dr. Virden was the technical group leader of the Colloids and Materials Design Group in the Materials Resource Unit in the Environmental and Health Sciences Division at PNNL. He was both the technical group leader and a technical contributor in the areas of non-thermal plasma technologies and advanced materials development. Dr Virden has over 20 technical publications and numerous technical presentations. He has been awarded a R&D 100 award for work on the development of non-thermal plasma technology, a Discover Award with Massachusetts Institute of Technology for fuel reformation technologies, and a Financial Times Global Automotive Award for PNNL's contributions to Delphi's development of nonthermal plasma technology for automotive applications. He holds two U.S. Patents and also received a PNNL Outstanding Team Award.

Prior to joining PNNL, he worked in the Science Research Laboratory at the 3M Company in St. Paul, MN, and was responsible for the development of ordered organic thin films for nonlinear optical applications.

TMS will offer a selection of three (3) learning intensive courses designed to enhance your technical and professional expertise. Programmed in conjunction with the 131st TMS Annual Meeting & Exhibition, these courses were developed in response to the training and information needs of today's engineering professional.

With such diverse and carefully selected topics, we invite you to consider the merits of each course, as well as the qualifications of the respective presenters, and join us in one of the following courses.

REGISTRATION

To register for a course, please use the conference registration form in this brochure. All three courses will be held at the Sheraton Seattle Hotel & Towers the weekend prior to the meeting, Saturday and Sunday, February 16-17, 2002.

You may register any time prior to the Annual Meeting and on site, but if you register by the advanced registration deadline of January 28, 2002, you will save an additional $50 late registration penalty. Course size is limited and a sufficient number of pre-registered attendees are necessary to offer each course, so please register early!

CANCELLATION POLICY

TMS reserves the right to cancel any courses due to low pre-registration. All pre-registered attendees will be notified of the cancellation and offered either a transfer or a full refund.

REFUND POLICY

Written requests must be sent to TMS Headquarters, 184 Thorn Hill Road, Warrendale PA 15086 postmarked no later than January 28, 2002. A $50 processing fee will be charged for all cancellations; this processing fee is separate from and in addition to the fee charged for cancellation of meeting registrations. Absolutely no refunds will be issued after the January 28, 2002 deadline.

Note to US residents:

A tax deduction may be taken for expenses of continuing education (including registration fees, travel, meals, and lodging) undertaken to maintain and improve professional skills. For more information concerning applicability, contact your local Internal Revenue Service office.

ALUMINUM SMELTER CELL DYNAMICS

1

Saturday, February 16, 2002 • 8:30am-5:00pm
Sunday, February 17, 2002 • 8:30am-12:00pm

Presented by: Barry Welch, *Emeritus Professor Univ. of Auckland & Visiting Professor Univ. of New South Wales*
Alton Tabereaux, *Alcoa*
Fiona Stevens McFadden, *Comalco Aluminum*
Jeffrey Keniry, *Alumination Consulting LTD*

Fees: Members $645, Non-members $735

Who Should Attend: This 2 day course is intended for managers, supervisors, engineers and scientists employed in either research or operations associated with aluminum smelting.

Course Overview: There is a wide range of different cell designs and technologies operating in the world. While all striving to improve their performances, subtle differences make it difficult to simply translate practices from other smelters – the difficulties are most commonly linked with operating practices and the consequential cell dynamics. This course is aimed at providing an understanding of the causes of cell dynamics, their relative importance, early detection of the trend towards poor cell performance, and options for minimization of these so that smelter performance is maximized.

Contents of the course will include an overview of electrolytes, cell conditions, and practices for different technologies. Operating causes of process variability and the importance of super heat and heat balance. Variability in aluminum fluoride concentrations and their minimization. Options for (and importance of) regular monitoring of cells; early diagnosis of poor cell conditions; cell diagnostics. The use of models and process control for minimization of process variability.

About the Presenters: Barry Welch is in his 40th year of research and development associated with aluminum smelting technology. He has worked in the industry as well as consulting, directing research programs and publishing extensively on aspects of smelter technology.

Alton Tabereaux is Manager of Process Technology, Alcoa Primary Metals. He graduated with a Ph.D. in Chemistry from the University of Alabama in 1971. He worked in Research and Development at Reynolds Metals Company for 26 years. He has become an acclaimed world leader in cell diagnostics and operations as well as being a regular contributor to TMS Light Metals. He teaches in the TMS Industrial Aluminum Electrolysis course as well as the international course on Process Metallurgy of Aluminum held in Norway each year. He has obtained 15 US patents and published over 50 technical papers.

Fiona Stevens McFadden has worked with Comalco for 10 years becoming their expert in modelling and design of smelting cells. She has also implemented new technology features in operating potrooms as well as having an interest in advanced process control. She has been on the Aluminum Committee of TMS and served as Light Metals Division sub-editor for the Aluminum Committee for JOM.

Jeff Keniry has been associated with aluminium smelting operations and technology development for more than 20 years. His consultancy, Alumination Consulting Pty Ltd, now specializes in process development and support to the international smelting industry. Previous roles have included Technical Manager at New Zealand Aluminium Smelters Ltd and General Manager of smelting research with Comalco Aluminium Ltd. Jeff is a past Committee member of TMS.

For the most up-to-date information on technical programming, special events, housing, registration, and proceedings, refer to TMS OnLine at: http://www.tms.org/Meetings/Annual-02/AnnMtg02Home.html.

If you need additional information on a particular course, please contact:
TMS – Christina Raabe
184 Thorn Hill Road
Warrendale, PA 15086 USA
Telephone: (724)776-9000, ext. 212 • Fax: (724)776-3770
E-mail: raabe@tms.org

TEXTURE AND ANISOTROPY FOR THE MATERIALS PROFESSIONAL 2

Sunday, February 17, 2002 • 8:30am-5:00pm

Presented by: Anthony D. (Tony) Rollett, *Carnegie Mellon University*

Fees: Members $395, Non-members $445

Who Should Attend: Have you always wondered what "pole figures" were all about? This course will bring you up to speed on texture (i.e. crystallographic preferred orientation) and anisotropy (e.g. different yield strengths in different directions). You will learn how to read pole figures and orientation distribution plots. The meaning of Euler angles and texture components will be explained. Basic concepts in anisotropic material properties such as modulus, strength and r-value will be related to texture.

If you work with polycrystalline materials, the chances are good that they have some degree of texture and therefore some anisotropy. Thus anyone who needs to understand how to measure texture and what tools are available to quantify it (e.g. popLA) will find this useful. A background in Materials Science & Engineering will be assumed (or some knowledge of crystal structure and diffraction).

Course Overview: Many unresolved issues exist in microstructural evolution such as the variations in grain boundary energy with misorientation, and the origin of strong recrystallization textures in the annealing of metals. Simulation techniques such as the Potts model are used to study grain growth, secondary recrystallization and recrystallization. Experimental and theoretical investigations of, for example, the early stages of recrystallization are revealing the critical features of nucleation of new grains.

Texture-anisotropy-plasticity relationships are being investigated in a wide range of materials. This field has been rejuvenated recently by the advent of Orientation Imaging Microscopy, on-line texture measurement and the ability to apply personal computers to the analysis of texture data. Control of texture for formability and other properties is still a significant issue for the metals industry. Learning how to process and optimize advanced materials and composites such as those based on intermetallics brings numerous challenges in micromechanics. Many materials are highly anisotropic and yet conventional processing fails to take the opportunity to engineer this aspect of materials. A fundamental theme that connects the study of microstructure and mechanical properties is the understanding of how microstructure evolves during deformation processing and how it influences the properties.

About the Presenter: Professor Anthony D. Rollett has worked for Carnegie Mellon University as Professor, Department of Materials Science & Engineering as Department Head since 1995. Prior to joining CMU, Prof. Rollett was with Los Alomas National Laboratory from 1979 to 1995. His current research interests focuses on the relationship of mechanical properties to microstructure, and on improving our understanding of how microstructures evolve. The use of computers is emphasized for processing large volumes of data and for simulating the behavior of materials, from grain growth to plastic flow. He is leading a project on anistropic interfaces and their impact on microstructural evolution as part of the DOE's Computational Materials Sciences Network.

Professor Rollett remains very active within TMS having served on numerous technical committees and as JOM Advisor. In addition, he actively publishes in technical journals.

COMPUTATIONAL MODELING TECHNIQUES AND APPLICATIONS FOR MATERIALS PROCESSING 3

Sunday, February 17, 2002 • 8:30am-5:00pm

Presented by: Dr. Chris Bailey, *University of Greenwich*
Dr. Daniel P. Cook, *Virginia Commonwealth University*

Fees: Members $395, Non-members $445

Who Should Attend: This course will appeal to Model Developers, Industrial Engineers, Managers, Code Users, Graduate Students, plus others, who want to learn more about the techniques used in computational modeling and how such technology can benefit scientific research and the design of industrial processes.

Course Overview: The aim of this course is to provide attendees with a general overview of the techniques used in computational modeling for simulating the processing of materials. Emphasis of the course will be to highlight best practice, with lots of examples. Detailed mathematical theory will be kept to a minimum, but the course notes will be supported by numerous references for attendees to follow up. Advantages and disadvantages of each of the modeling methods for certain applications will also be discussed. The course will detail each of the following:

(1) Physics that needs to be addressed in modeling materials based processes.
(2) Introduction to the governing mathematical equations.
(3) Different methods of discretisation (FD, FE, FV, BE, others).
(4) Solution Methods (Direct, Iterative, Implicit, Explicit, MultiGrid, Parallel, etc).
(5) Current trends in modeling across the length scales (Nano-Micro-Macro).
(6) Current trends towards modeling interacting phenomena – Multiphysics modeling.
(7) Real world applications and that illustrate the above. For example: Continuous and Shape Casting; Wielding and Joining Processes; Metal Refining; Magneto Hydrodynamics for Metal Flows.
(8) How to including computational modeling technology into the industrial environment.

About the Presenters: Dr Chris Bailey is a Reader (Associate Professor) in Computational Mechanics. He holds a PhD in Mathematical Modeling and an MBA in Technology Management. After completing his PhD in 1988 he joined the Metallurgical Engineering and Materials Science Department at Carnegie Mellon University, USA, to provide expertise in modeling the metals casting process. In 1991 he returned to the UK joining the Centre for Numerical Modeling and Process Analysis at the University of Greenwich as a Reader (Associate Professor) in Computational Mechanics. Dr Bailey has worked closely with industry on a number of projects to develop and use computational modeling technology for processes such casting, joining, forging, refining, plus many others. He is a member of TMS, the Society for Industrial and Applied Mathematics (SIAM), a Fellow of the Institute for Mathematics and its Applications (IMA), and a member of the IEEE. Dr Bailey has published over 80 refereed papers on computational modeling and its application to the processing of materials and is a consultant for a number of international companies and government organizations.

Dr. Daniel P. Cook is an Assistant Professor of Mechanical Engineering. He received his Ph.D. in Materials Science and Mineral Engineering from the University of California at Berkeley in 1993. He then held post-doctoral positions with Laboratoire MADYLAM at the University of Grenoble, France and the Centre for Numerical Modelling and Process Analysis at the University of Greenwich, UK. He then spent five years working in the Corporate Research and Development division of Reynolds Metals Company before joining the faculty at Virginia Commonwealth University where he teaches Thermodynamics, Heat Transfer and Computational Fluid Dynamics. He is a member of TMS and AIME.

FUTURE ANNUAL MEETING SITES

TMS ANNUAL MEETING & EXHIBITION

More than 1,200 technical presentations and 30,000 square feet of exhibitions will detail the latest advances and most critical developments in minerals, metals, and materials science and technology.

2003 – San Diego, CA	March 2-6	San Diego Convention Center
2004 – Charlotte, NC	March 14-18	Charlotte Convention Center
2005 – San Francisco, CA	February 13-17	Moscone West Convention Center
2006 – San Antonio, TX	March 12-16	San Antonio Convention Center

For more information on any of these TMS Annual Meetings, please contact:

TMS Meeting Services Department
184 Thorn Hill Road
Warrendale, PA 15086
Telephone: (724)776-9000, ext. 243
Fax: (724)776-3770
E-mail: mtgserv@tms.org

YOUNG LEADERS TUTORIAL

Monday, February 18, 2002 • 12:00 pm – 1:30 pm • Sheraton Seattle Hotel and Towers

"What is the purpose of the P.E. and why do you need it?"

Presented by Chuck White, *Kettering University*

About the topic: Why should you go through the pain of taking the exam for two extra letters after your name? This tutorial will be a frank discussion about what it means to be a professional and to hold a state license. What are the motivating factors to take the P.E. exam? We will explore what credentials are needed to qualify for the exam, specifications of the exam and how they were determined, the new multiple-choice format, and the calibrations of the exam. In addition, we will try to focus on current and future state regulatory practices with emphasis on the ramifications of registration in the litigate environment. Ample time will be allowed for open discussion.

About the presenter: Professor White has 35 years of industrial, teaching, applied research, and consulting experience in the area of materials processing, failure analysis and manufacturing. He holds degrees from the University of Illinois, Wisconsin and Michigan, and is a registered professional engineer in Ohio and Michigan. He is the past chairman of the TMS Professional Registration Committee and has been active in the PE exam process for 15 years. He is currently a Professor in the Manufacturing Engineering Dept at Kettering University.

Optional box lunch for $25 may be purchased via the TMS Annual Meeting Registration form.

LIGHT METALS DIVISION LUNCHEON

Wednesday, February 20, 2002

"Magnesium, the Uncomfortable Metal with a Comfortable Future"

Presented by Dr. Gerald S. Cole, *Ford Motor Company*

About the topic: This is the second year in a row that the Light Metals Division Luncheon has had a magnesium focus. Last year, we heard what one producer company, Hydro Magnesium thinks about this wundermetal. This year you will hear a consumer's side.

Why should anyone care about magnesium? Whereas the average vehicle has over 120 kgs of aluminum, it has only 4.5 kg of mag; at 0.03% of a vehicle's mass, that's not particularly noticeable. Why is that? Automotive engineers "know" that magnesium burns, corrodes and fractures, is unreliable, cannot be worked or joined, has poorly understood properties and is expensive. But those are old husband's tails. The object of this presentation is to change your paradigms. Even where lightweight is not a valuable attribute, and this has been magnesium's most visible attribute, magnesium is growing in use for automotive construction. New alloys and technologies have been developed through R&D nurtured by North American and European automotive industries. New exciting lightweight components, are being developed that could exploit this intellectual database and complement aluminum and plastic/composite products. This talk will outline the direction for the automotive uses of magnesium and will indicate how all materials must cooperate if we materials scientists/engineers are to support the growing demand for functional, safe, low cost, lightweight vehicles.

About the presenter: Dr. Gerald Cole is a Senior Staff Technical Specialist with Ford Motor Company's Scientific Research Laboratory in Dearborn Michigan. He has performed materials science, foundry engineering and solidification R&D for almost 40 years, has published over 120 papers, holds 9 patents and has made hundreds of presentations around the world. Jerry's cast metal expertise encompasses irons, aluminum, aluminum matrix composites, and recently magnesium, where he is recognized as a world automotive expert. Jerry has been instrumental in developing Ford's lightweighting strategy with magnesium. Jerry is a director of the International Magnesium Association, and past director of AFS's Detroit Chapter and the IMS. He is a fellow of ASM International, is cited in 3 Whos Who and in American Men & Women in Science.

Luncheon tickets are $30 and may be purchased via the TMS Annual Meeting Registration form.

EXTRACTION & PROCESSING DIVISION LUNCHEON

Tuesday, February 19, 2002

"New Developments in Copper Extraction – A Perspective"

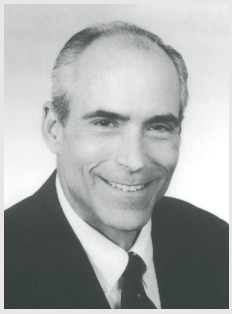
Presented by John O. Marsden, P.E., *Phelps Dodge Mining Company*

About the topic: The copper industry has a history of extreme cyclical change which, similar to other commodities, is caused by the supply and demand balance of copper in the market place. New developments in copper extraction technology are arguably both the cause and effect of this cyclical relationship: On the one hand, successful technology developments result in lower costs of production, which in turn leads to increased copper production and consequently to a decrease in the metal price. On the other hand, a lower copper price tends to drive technological innovation as producers are forced to reduce their cost of production to maintain competitiveness in the industry. This presentation reviews some of the major technology developments in copper extraction from a historical perspective, and then discusses a number of important emerging new technological developments that will shape the future of the copper industry going forward.

About the presenter: John O. Marsden, P.E., is Vice President of Technology and Development for Phelps Dodge Mining Company, a subsidiary of Phelps Dodge Corporation. He received a B.S. in Mineral Technology from the Royal School of Mines, London. He held various operations and technical management positions during eight years with Consolidated Gold Fields PLC and eleven years with Phelps Dodge Corporation. He joined Phelps Dodge Exploration Corporation in 1990 as a metallurgist and served as Vice President of Technology, and Manager, Concentrator Operations at Compania Minera Candelaria, Copiapo Chile, prior to his current position. Mr. Marsden is a registered professional engineer and serves on the SME Professional Registration Committee. Past SME service includes the Richards Award Committee, Accreditation & Curricular Issues Committee, Taggart Award Committee, Wadsworth Award Committee as well as Chairman of SME Plant Design & Practice Committee.

Luncheon tickets are $30 and may be purchased via the TMS Annual Meeting Registration form.

131ST TMS BANQUET AND AWARDS PRESENTATION
With Installation of 2002 TMS President



Wayne R. Hale
2001 TMS President

The TMS Banquet and Awards Presentations will be held at 7:00 pm Tuesday, February 19, 2002 at the Sheraton Seattle Hotel and Towers. The highlight of the 131st TMS Annual Meeting & Exhibition will begin with a cash bar reception at 6:00 pm and dinner at 7:00 pm. Dark business suits are appropriate attire for the gentlemen.

Following dinner, 2001 TMS President Wayne R. Hale will present the TMS awards. The presentations will be followed by a short address by incoming 2002 President John E. Allison

John E. Allison is a Senior Staff Technical Specialist in the Materials Science Department at Ford Motor Company in Dearborn, Michigan. He has been been a contributing member of TMS for over twenty years, serving TMS in a number of capacities, notably on the TMS Board as Director of Programming and more recently in a leadership capacity with the Structural Materials Division. His professional position with the Research Laboratory of Ford Motor Company has given him broad international exposure to the materials community from primary metals producers to key automotive suppliers. He has also served on the Nominating Committee and the Student Affairs Committee.

Banquet tickets are $60 and may be purchased via the TMS Annual Meeting Registration form.

John E. Allison
2002 TMS President

In conjunction with the Charles J. McMahon Interfacial Segregation and Embrittlement Symposium

CHARLES MCMAHON HONORARY DINNER

Monday, February 18, 2002 • Sheraton Seattle Hotel & Towers

Sponsored by: SMD, MPMD, ASM-MSCTS, Jt. Mechanical Behavior of Materials, Jt. Computational Materials Science & Engineering, Texture & Anisotropy Committee.

Nature and driving force for Interfacial Segregation, Temper Embrittlement (Embrittlement in steels due to heat treatment), Segregation and Embrittlement in high temperature alloys due to service exposure, Embrittlement due to weld thermal cycles, Reheat cracking, Weld sensitization, Segregation resulting in enhanced corrosion and SCC, Irradiation induced segregation and resulting SCC, Impact on fracture, fracture mechanics and fatigue, Segregation to other than grain boundaries, and its influence on properties, Computer modeling of segregation and the resulting embrittlement.

Dinner tickets are $60 and may be purchased via the TMS Annual Meeting Registration form.

In conjunction with the International Symposium on Science and Technology of Interfaces in Honor of Dr. Bhakta Rath

BHAKTA RATH HONORARY DINNER

Monday, February 18, 2002 • Sheraton Seattle Hotel & Towers

Sponsored by: SMD, EMPMD, ASM-MSCTS, Physical Metallurgy Committee, Superconducting Materials Committee, Jt. Mechanical Behavior of Materials, Titanium Committee.

The objective of this symposium is to present current research and developments on interfaces in a variety of materials ranging from advanced nanostructured materials to high Tc superconductors. Special attention will be paid to the effects of interfaces on the unique, highly desirable properties of these materials; as well as their applications. The symposium aims to assess the current status and to identify future directions of R&D in these materials. Special focus will be on the following topics: synthesis and processing; modeling; characterization & properties.

Dinner tickets are $60 and may be purchased via the TMS Annual Meeting Registration form.

YOUNG LEADERS
Attention TMS Professional Members Under Age 35!

You are invited to attend the TMS Young Leaders Business Meeting and Reception on Sunday, February 17. Check the calendar of events for meeting time and room location.

2002 CAREER FAIR -

ALL TMS CONFERENCE REGISTRANTS ARE CORDIALLY INVITED TO PARTICIPATE IN THIS EXCITING OPPORTUNITY...

TMS's exclusive 2002 Career Fair. This chance of a lifetime event is held in conjunction with the TMS 2002 Annual Meeting and Exhibition in Seattle, WA on February 19 from 10:00 am – 5:00 pm at the Washington State Convention and Trade Center.

The event is free and open to all TMS Conference attendees. "The TMS Career Fair allows companies to recruit for various levels of science and engineering professionals," said Amy Taylor, Corporate Sales Manager of BrassRing, the company collaborating with TMS to organize the event.

The TMS Career Fair is specialized to bring together top employers and qualified candidates in the minerals, metals and materials industries. Companies participating will receive a resume database of all the Career Fair attendees as well as the candidates who could not attend. This provides members with the opportunity to be contacted after the event has ended.

When you attend the TMS Career Fair, you'll find:

Leading companies you might have never known about before;
The opportunity to promote yourself face-to-face or online with hiring managers;
No extra obligation or cost to participate.

For participants to sign up:

Register on-line at www.tms.org/Meetings/Annual-02/AnnMtg02Home.html.

Companies interested in recruiting can obtain more information on exhibiting at the Career Fair by calling Amy Taylor at (800)299-7494, ext. 308.

CONGRATULATIONS TO THE 2002 TMS AWARD WINNERS!

TMS FELLOW CLASS OF 2002
Gary R. Purdy, *McMaster University*
Ricardo B. Schwartz, *Los Alamos National Laboratory*
Changxu Shi, *Natural Science Foundation of China*
Edgar A. Starke, Jr., *University of Virginia*
Man H. Yoo, *Oak Ridge National Laboratory*

APPLICATION TO PRACTICE AWARD
Michael F. X. Gigliotti, *General Electric Corporation*

JOHN BARDEEN AWARD
John Poate, *Axcelis Technologies, Inc.*

BRUCE CHALMERS AWARD
Michel Rappaz, *Ecole Polytechnic Federale*

DISTINGUISHED SERVICE AWARD
Joseph D. Defilippi, *United States Steel*

EDUCATOR AWARD
Alan Lawley, *Drexel University*

ROBERT LANSING HARDY AWARD
Paul V. Braun, *University of Illinois*

WILLIAM HUME-ROTHERY AWARD
Larry Kaufman, *Lecturer/Consultant*

INSTITUTE OF METALS/ROBERT FRANKLIN MEHL AWARD
Frans Spaepen, *Harvard University*

LEADERSHIP AWARD
Robert L. Snyder, *The Ohio State University*

CHAMPION H. MATHEWSON AWARD
Man H. Yoo, *Oak Ridge National Laboratory*

Chong-Long Fu, *Oak Ridge National Laboratory*

TECHNICAL DIVISION AWARD WINNERS

ALUMINUM DISTINGUISHED SERVICE AWARD
James W. Evans, *University of California-Berkeley*

EXTRACTIVE PROCESSING LECTURER
Ramana G. Reddy, *The University of Alabama*

EXTRACTIVE PROCESSING SCIENCE AWARD
H. Hayashi, *Nippon Steel*
A. Becker, *University of California*
James W. Evans, *University of California*

EXTRACTIVE PROCESSING TECHNOLOGY AWARD
C.F.M. Copini, *Budel Zink*
G.H.R. Janssen, *Paques BV*
C.J.N. Buisman, *Paques BV*
S. Vellinga, *Paques BV*

LIGHT METALS TECHNICAL SERVICE AWARD
Christian Bickert, *Pechiney Group*

LIGHT METALS AWARD
Steven P. Rosenberg, *Worsley Alumina Pty Ltd*
Carrel J. Wilson, *Worsley Alumina Pty Ltd*
Catherine A. Heath, *Worsley Alumina Pty Ltd*

STRUCTURAL MATERIALS DISTINGUISHED SCIENCE/ENGINEER AWARD
George T. (Rusty) Gray, *Los Alamos National Laboratory*

STRUCTURAL MATERIALS DISTINGUISHED SERVICE AWARD
Stephen M. Bruemmer, *Pacific Northwest National Laboratory*

2002 HUME-ROTHERY AWARD SYMPOSIUM

Monday, February 18, 2002

Calphad Thermodynamics

Larry Kaufman, *Lecturer/Consultant*

Sponsored by: Jt. EMPMD/SMD Alloy Phases Committee

About the topic: Hume-Rothery's "Atomic Theory for Students of Metallurgy" was an advanced text that introduced modern quantum mechanical ideas to undergraduates in the early 50's. In 1966 Mr. Kaufman had the opportunity to spend a week in Geneva at the Battelle Conference on "Phase Stability in Metals and Alloys" with Hume-Rothery, Brewer, Zener, Friedel and Kubaschewski. Hume-Rothery invited him to review the subject for Volume 14 of Progress in Materials Science, published in 1969 which Hume-Rothery edited and they had an extensive 30-month discussion by mail covering many aspects of the Battelle Conference and Mr. Kaufman's PMS paper until Hume-Rothery's death in September 1968. Kubachewski's NPL and Brunel conferences in July 1971 and the Munster Conference in 1972 set the stage for the birth of the "CALPHAD" method, Journal and Conferences which have grown and continue until today. At the TMS 2001 Annual Meeting in New Orleans, the Symposium on "Computational Thermodynamics and Materials Design" illustrated many cases where CALPHAD THERMODYNAMICS, affording the broadest description of the stability of stable, metastable and unstable phases over wide ranges of composition, temperature and pressure could be used in the description of commercially useful materials and processes. This discussion will make the connection between Hume-Rothery's seminal work, the basis adopted in the development of the predictive CALPHAD method and the current status of the science of "Alloy Thermodynamics". A number of unresolved problems and areas for research opportunities will be addressed.

About the presenter: Larry Kaufman received his B. Met. Eng. from the Polytechnic Institute of Brooklyn in 1952 and his ScD from the Massachusetts Institute of Technology in 1955. He has been the organizer of CALPHAD, Inc. 1973-present, founding editor of CALPHAD Journal 1977-present and annual CALPHAD Conference, Annual Worldwide Conference started in Cambridge in 1973 to CALPHAD XXIX, June 2000. Founder of CALPHAD Method for Computer Coupling of Phase Diagrams and Thermo Chemistry used widely in Materials Design and Analysis.

He published 120 technical papers and co-authored "Computer Calculation of Phase Diagrams" with Harold Bernstein in 1970 and "Development of Very High Temperature Boride Composites for Re-entry Applications." Mr. Kaufman received various awards including the William Hume-Rothery Award of the Institute of Metals – London, 1996.

INSTITUTE OF METALS LECTURE & ROBERT F. MEHL MEDALIST

Wednesday, February 20 2002 • 12 Noon

The Structure of Liquids and Solid-Liquid Interfaces

Frans Spaepen, *Harvard University*

About the topic: Identifying the principle that underlies the structure of even the simplest liquids is an enduring scientific challenge. Starting with the basic facts about liquids, this talk will critically review the structural models that have been proposed over the decades. In the picture that emerges, the liquid is a phase in its own right (not a defective crystal, nor simply a dense gas) with a polytetrahedral structure. This structural principle can be used to understand the interface between crystals and liquids and its role as the barrier for crystal nucleation from the melt.

About the presenter: Frans Spaepen is Gordon McKay Professor of Applied Physics at Harvard University. He received his undergraduate degree, in Metallurgical Engineering, at the University of Leuven in 1971, and a Ph.D. in Applied Physics from Harvard University in 1975. He joined the faculty of the Division of Applied Sciences at Harvard in 1977. In 1984 he was a Visiting Professor at the University of Leuven, and in 2000-01 a Humboldt visitor in Köln and Jülich. From 1990 till 1998 he was Director of the Harvard Materials Research Laboratory/Materials Research Science and Engineering Center.

His research interests span a wide range of experimental and theoretical topics in materials science, such as amorphous metals and semiconductors (viscosity, diffusion, mechanical properties), the structure and thermodynamics of interfaces (crystal/melt, amorphous/crystalline semiconductors, grain boundaries), mechanical properties of thin films, and the perfection of silicon crystals for metrological applications.

Dr. Spaepen is a Fellow of the American Physical Society, a Fellow of TMS, and a Foreign Member of the Vlaamse Academie voor Wetenschappen en Kunsten. He is co-editor of Solid State Physics, Principal editor of the Journal of Materials Research, and an editorial board member of a number of materials science journals.

EXTRACTION & PROCESSING DIVISION DISTINGUISHED LECTURER

Tuesday, February 19, 2002•1:30 pm – 3:00 pm

Emerging Technologies in Extraction and Processing of Metals

Ramana G. Reddy, *FASM, The University of Alabama*

About the topic: The growing need to conserve energy, materials and prevent environmental pollution led to an increased demand for better understanding of potential as well as existing processes. In this context, thermodynamic and transport modeling of materials and processes provides a rapid and cost–effective means of conducting and minimizing the complexity of experimental investigations and developing innovative and environmentally friendly metallurgical processes. This presentation concentrates on some of the key examples from the author's experience, application of engineering fundamentals on new technologies as extractive metallurgy of copper, lead, aluminum and other nonferrous metals and processing of nanocomposites. Some possible ideas will be discussed for future directions in extraction and processing of metals and training of professionals in this exciting discipline.

About the presenter: Dr. Ramana G. Reddy is an ACIPCO Chair Professor of Metallurgical and Materials Engineering; Associate Director of Center for Green Manufacturing; and Adjunct Professor of Chemical Engineering at The University of Alabama. His academic and research work experiences include: Professor and Chairman of the Department of Chemical and Metallurgical Engineering at University of Nevada, Reno; Visiting Researcher at Lawrence Berkeley Laboratory; Indian Institute of Technology, Bombay; and Argonne National Laboratory.

Professor Reddy has 20 years of teaching and research experience in the field of chemical and materials engineering. He obtained his Ph.D. degree from the University of Utah. He has conducted projects involving thermodynamics and kinetics of metallurgical reactions; Pyrometallurgy, Hydrometallurgy, Plasma processing of metals, Molten Salt Electrolysis and Waste Processing.

He has published over 164 research papers in journals and 7 books including one undergraduate student textbook in thermodynamics. He has also delivered more than 116 invited lectures and research presentations in the USA and abroad. He has advised and worked with over 60 research scholars, students and visiting scientists. Dr. Reddy was recently recognized as a John Lewis Distinguished Lecturer of the year by the University of Utah.

Dr. Reddy has served in many leadership positions within the College of Engineering, University and other national and international organizations and has received many honors and awards.

ATTENTION ALL NON-MEMBER REGISTRANTS!

All attendees of the 131st TMS Annual Meeting, who register at the non-member fee, will automatically receive a one-year, complimentary associate membership for 2002!

Associate members receive all of the same benefits as members, including a subscription to JOM, discounts on TMS publications and meeting fees, inclusion in and access to the TMS Membership Directory on TMS OnLine, plus an array of other personalized membership benefits and services. Your membership card and new member packet, along with a postal card asking for additional information for our records will be sent to you immediately after the meeting. Your associate membership will be activated upon completion of your registration form and payment of the non-member registration fee. If you have any questions, please contact TMS Member Services at (724)776-9000, ext. 241.

Advance Registrants:
Your 2002 TMS Membership will be processed immediately. At the meeting, stop by the TMS Membership Booth to receive your free gift and enter our grand prize drawing!

On-Site Registrants:
Proceed directly to the Non-Member Only Registration Area, where your form will be processed quickly. Receive your new member sticker on the spot; then stop by the TMS Membership Booth to receive your free gift and enter our grand prize drawing!

THE FOLLOWING TITLES WILL BE AVAILABLE AT THE MEETING. RESERVE YOUR COPY ON THE ENCLOSED TMS ANNUAL MEETING REGISTRATION FORM.

CALPHAD and Alloy Thermodynamics

Patrice E.A. Turchi, Antonios Gonis, and Robert D. Shull, editors

These proceedings emphasize all theoretical aspects of computational thermodynamics and kinetics and their impact on the science of alloys and materials design. The book will provide an assessment of the CALPHAD (Calculation of Phase Diagrams) approach pioneered by 2002 Hume-Rothery Award recipient Larry Kaufman, a review of the current status of the software applications based on the CALPHAD approach, the impact of CALPHAD on alloy thermodynamics and design, and future prospects. The book will provide a detailed picture of the development of CALPHAD and point to further research.

ISBN 0-87339-514-X

Approx. 390 pp., illus., index, hardcover

Order No. 514X

Member price: $72

Computational Modeling of Materials, Minerals, and Metals Processing

M. Cross, J.W. Evans, and C. Bailey, editors

This set contains the proceedings, in both print and CD-ROM formats, of the Computational Modeling of Materials, Minerals, and Metals Processing Symposium to be held at the 2002 TMS Annual Meeting in Seattle, Washington.

Computational models offer an effective way to design, analyze, and optimize materials, metals, and minerals processing. Computational modeling is increasingly becoming the means by which every factor in the operation of a process can be analyzed in a rational manner. Such models also represent a framework for much of our understanding of process operations.

This international symposium brings together participants from all aspects of computational modeling of materials, minerals, and metals processing, including the engineers involved primarily in specific applications, developers of computational modeling tools, and the developers of models. This allows all involved to understand the most recent advances in this rapidly developing enabling technology.

ISBN 0-87339-513-1

Approx. 700 pp., illus., index, hardcover & CD-ROM

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Price: $129

Creep Deformation: Fundamentals and Applications

Rajiv S. Mishra, James C. Earthman, and Sai V. Raj, editors

These proceedings focus on the application of fundamental creep research to the design and development of high temperature materials for engineering applications. The book deals with all aspects of creep deformation and high temperature materials development, specifically the influence of microstructures on various aspects of creep and the application of this information in the design of highly creep resistant materials. Emphasis will be placed on advanced ceramic and metal matrix composites and advanced intermetallics.

This volume brings together researchers working on fundamental issues relating to the development and characterization of high temperature materials and design engineers involved in high temperature applications.

ISBN 0-87339-515-8

Approx. 415 pp., illus., index, hardcover

Order No. 5158

Member price: $105

EPD Congress 2002

Patrick R. Taylor, editor

The Extraction & Processing Division Congress, held at the TMS Annual Meeting & Exhibition each year, has become the definitive annual forum for new technological developments in the process metallurgy community. This volume will also include the proceedings of the Fundamentals of Advanced Materials for Energy Conversion symposium.

In addition to general abstracts, this year's edition will include papers on:

- Modeling of high temperature alloy processing
- General pyrometallurgy
- Generation, treatment, metal recovery, and disposal of flyash
- Imaging of dynamic processes
- Materials processing fundamentals
- General recycling of materials

ISBN 0-87339-516-6

Approx. 812 pp., index, hardcover

Order No. 5166

Member price: $96

High-Cycle Fatigue, the David L. Davidson Symposium

Kwai S. Chan and Peter K. Liaw, editors

These proceedings from the David L. Davidson Symposium on High-Cycle Fatigue review the current research activities and assess the state-of-the-art in high-cycle fatigue, which has become a major concern in the design of engineering components and structures. This volume will include papers on a basic understanding of failure mechanisms, experimental methods and studies, modeling and simulation, and life-prediction methodology. This volume will also contain papers from the Fatigue of High Temperature Alloys Symposium, which deals with fatigue behavior of high temperature alloys, including crack initiation and propagation modes.

ISBN 0-87339-518-2

Approx. 350 pp., index, hardcover

Order No. 5182

Member price: $110

High Performance Metallic Materials for Cost-Sensitive Applications

F.H. (Sam) Froes and Lu Li, editors

These proceedings will examine the most recent advances and best practices in structural materials selection, design, and manufacturing for producing affordable components, with a focus on titanium, aluminum, and other advanced metallic materials. This volume will discuss melting, casting, powder metallurgy, forging, forming, extrusion, and machining, as well as processing advances, innovative processing techniques, process modeling and materials by design, new alloys, and related processing-microstructure-properties-performance-cost studies.

ISBN 0-87339-522-0

Approx. 295 pp., index, PDF publication

Order No. 5220

Member price: $117

All proceedings are concurrent with the meeting. Books purchased via the TMS Annual Meeting Registration form and not picked-up at the meeting will be shipped after the close of the meeting.

Light Metals 2002

Wolfgang Schneider, editor

Held at the TMS Annual Meeting & Exhibition each year, the Light Metals series has become the definitive annual reference source in the field of aluminum production and related light metals technologies. Each volume contains complete coverage of advancements and current work in cast shop technology, alumina and bauxite, carbon technology, aluminum reduction technology, and recycling. In addition, Light Metals 2002 includes coverage of reactive metals and advances in molten salt processing technology. Light Metals 2002 is sold as a package that includes the proceedings in both hardcover and text-searchable CD-ROM formats.

ISBN 0-87339-519-0

Approx. 1200 pp., illus., index, hardcover & CD-ROM

Order No. 5190

Member price: $158

Magnesium Technology 2002

Howard Kaplan, editor

From the third annual symposium on magnesium technology, these proceedings include papers on all aspects of extraction and processing, physical and mechanical properties, alloy development, and production of magnesium.

Coverage includes:

- Fundamentals of Magnesium Production—Electrolytic and Thermal
- Materials for Magnesium Production
- Magnesium Cast House Technology—Casting and Solidification
- Environmental Issues
- Magnesium Recycling/Cover Gas Issues
- Magnesium and Corrosion—Cathodic Protection and Corrosion-Resistant Alloys
- Alloy Development—Structural, Thixo and Wrought Alloys, and High-Temperature Alloys
- Alloy Properties and New Applications
- Magnesium and the Automotive Industry
- Magnesium R&D Needs

Magnesium Technology 2002 is sold as a package that includes the proceedings in both hardcover and text-searchable CD-ROM formats.

ISBN 0-87339-524-7

Approx. 372 pp., illus., index, hardcover & CD-ROM

Order No. 5247

Member price: $111

International Symposium on Science and Technology of Interfaces in Honor of Dr. Bhakta Rath

S. Ankem and C.S. Pande, editors

These proceedings present current research and developments on interfaces in a variety of materials ranging from advanced nanostructured materials to high Tc superconductors. Special attention will be given to the effect of interfaces on the unique, highly desirable properties of advanced materials, with an assessment of current status and future direction. The book will act as a source, for both researchers and graduate students, of the latest knowledge on the role of interfaces in advanced materials for research and design.

ISBN 0-87339-520-4

Approx. 513 pp., illus., index, PDF publication

Order No. 5204

Member price: $122

Sulfide Smelting 2002

Robert L. Stephens, and H.Y. Sohn, editors

These proceedings focus on all aspects of the pyrometallurgical production of primary metals from sulfide concentrates. Papers discuss industrial operations producing copper and nickel and the direct production of lead and zinc. Key topic areas include smelting and converting processes, recently completed capital projects, current operating practices, the predicted future of sulfide smelting operations, furnace integrity and refractory design, gas handling processes and equipment, issues related to the treatment of high-strength sulfur dioxide-containing off-gases, the production of alternative sulfur products, the treatment of acid plant blowdown streams and sulfated smelter dusts, and the capture and treatment of fugitive emissions.

ISBN 0-87339-525-5

Approx. 600 pp., illus., index, hardcover

Order No. 5255

Member price: $70

Surface Engineering: Science and Technology II

Ashok Kumar, Yip-Wah Chung, and John J. Moore, editors

These proceedings address the scientific issues related to surface engineering phenomenon in synthesis, characterization, and application for all materials. This collection of papers provides a multidisciplinary discussion on surface-related phenomena by which materials performance may be enhanced through engineered interfaces and surface modification technologies. Applied experimental and theoretical aspects that highlight, develop, and utilize approaches to understand and improve surface phenomena are also included.

ISBN 0-87339-521-2

Approx. 414 pp., illus., index, PDF publication

Order No. 5212

Member price: $111

Ultrafine Grained Materials II

Yuntian Theodore Zhu, Terry G. Langdon, and Rajiv S. Mishra, editors

These proceedings focus on all aspects of science and technology of bulk ultrafine-grained materials produced by severe plastic deformation (SPD) techniques. The potential of SPD techniques in producing clean and fully dense, bulk ultrafine-grained materials for scientific explorations and practical structural applications has made it a rapidly developing area. This book provides an update on advances in the areas of processing microstructures, microstructural evolution, mechanical and physical properties, superplasticity, computational and analytical modeling, and new SPD technologies and advances.

ISBN 0-87339-523-9

Approx. 415 pp., illus., index, hardcover

Order No. 5239

Member price: $70

TMS welcomes the contribution of the Aluminum Association to the TMS 2002 program...

ALUMINUM SHEET AND PLATE ROLLING & FINISHING TECHNOLOGY AND APPLICATION

A symposium addressing the needs of personnel working and interested in the production, finishing, and application of aluminum, with coverage of topics related to sheet, plate and foil processing, rolling, gauges, surface inspection and finishing operations.

Don't miss this presentation of today's most current and useful information!

2002's exhibit hall will include more than 150 booths featuring new products and processes, ideas and information for your business.

You'll be amazed at the amount of information you'll acquire, so be sure to plan to visit Exhibition 2002!

Washington State Convention and Trade Center
Hall 4A, B, C

Show Dates and Hours:
Monday, February 18, 2002 ..... 12:00 Noon – 6:00 pm
Tuesday, February 19, 2002 ..... 9:30 am – 5:30 pm
Wednesday, February 20, 2002 ..... 9:30 am – 3:00 pm

To visit the exhibition, complete and return the enclosed registration form or contact TMS for an Expo Pass.

To obtain the Exhibition Prospectus, contact:
Cindy A. Wilson
Telephone: (724)776-9000, ext. 231
Fax: (724)776-3770
Email: wilson@tms.org

Special attractions at the 2002 Exhibition:
Hosted Grand Opening Reception—An opportunity to visit the booths while enjoying a hosted reception
Monday ..... 5:00 pm – 6:00 pm

Complimentary Lunch—Registrants can enjoy a hosted sandwich or salad, and beverage in the exhibit hall while visiting the booths
Tuesday ..... 11:45 am – 1:15 pm

Wednesday Snack—Join us in the exhibit hall for a cappuccino, espresso or ice cream treat!
Wednesday ..... 12:15 pm – 2:00 pm

To take part in the Exhibition and Mini-Sessions or for more details, contact (724)776-9000, ext. 231

The exhibition celebrates its 15th year as part of the TMS Annual Meeting & Exhibition! The event has grown to feature:
- -over 30,000 square feet of exhibits
- -more than 150 exhibiting companies
- -an extensive scope with over 30 categories of equipment, materials, services and technology. Here are just a few:
  - *Aluminum production technology & Equipment*
  - *Anodes*
  - *Automation and Computer Simulation*
  - *Carbon Technology*
  - *Casting*
  - *Degassing*
  - *Dross Processing and Handling*
  - *Filtration*
  - *Furnaces*
  - *Grain Refiners & Master Alloys*
  - *Graphite*
  - *Engineering and Consulting Services*
  - *Measurement, Testing & Analysis Equipment & Services*
  - *Process Equipment*
  - *Recycling Technology*
  - *Refractory & Insulating Supplies*

PLAN TO ATTEND
Commercial Technology Mini-Sessions

Make plans to attend the special commercial presentations featuring:
- New and innovative technology
- Equipment and process innovations

Location: Washington State Convention and Trade Center, In a meeting room convenient to the technical sessions and exhibition.

Commercial Technology sessions are designed to compliment the technical program and exhibition, and to provide additional details regarding products and services featured on the exhibit floor.

Technical areas featured in the commercial mini-sessions include:
- Alumina Technology
- Furnaces
- Melt Treatment
- Reduction Technology
- Refractories

Monday, February 18 and Tuesday, February 19, 2002
11:45 am to 2:00 pm

Attendance at the Mini-Sessions is complimentary for all meeting registrants.

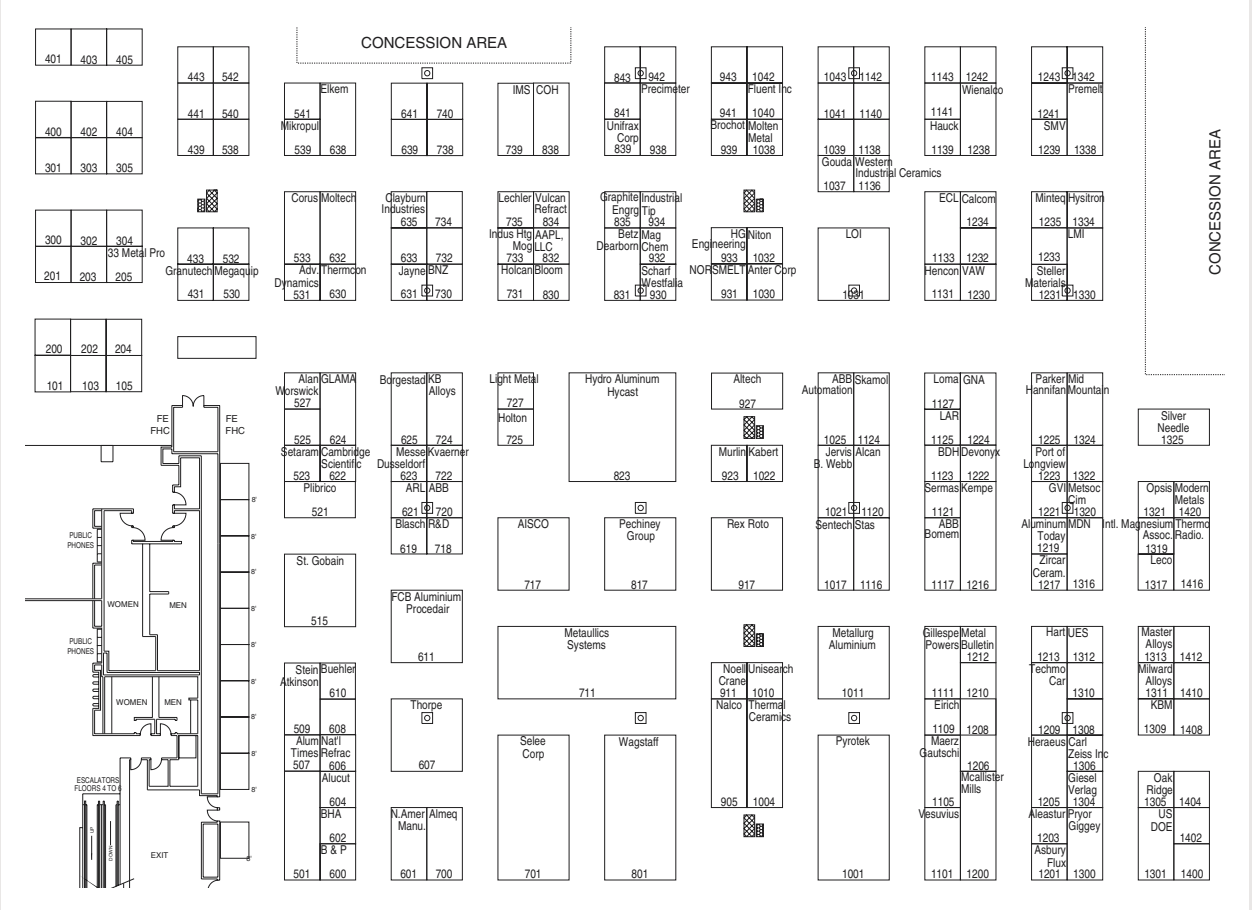
EXHIBITOR LIST: *(AS OF 9/24/01)*

COMPANY	BOOTH #
33Metalproducing	205
AAPL, LLC	832
ABB Bomem Inc	1117
ABB Inc—Metal Refining Systems	1025
ABB Industrie AG	720
Advanced Dynamics Corp	531
AISCO Systems Inc	717
Alan Worswick Ltd	527
Alcan Inc	1120
Aleastur	1203
Almeq Norway AS	700
Altech	927
Alu-Cut International	604
Aluminium Times	507
Aluminum Today	1219
Anter Corp	1030
Asbury Fluxmaster	1201
B&P Process Equipment Systems LLC	600
BDH Industries Inc	1123
BHA Group Inc	602
BNZ Materials Inc	730
BetzDearborn	831
Blasch Precision Ceramics	619
Bloom Engineering	830
Borgestad Fabrikker AS	625
Brochot	939
Buehler	610
Calcom SA	1234
Cambridge Scientific Abstracts	622
Canadian Overhead Handling Inc	838
Carl Zeiss Inc.	1306
Clayburn Industries Ltd	635
Corus Aluminum Walzprodukte Gmbt	533
Devonyx Technologies Inc	1222
ECL	1133
Eirich Machines Inc	1109

COMPANY	BOOTH #
Elkem Metals Inc	638
FCB Aluminium	611
Fluent Inc.	1040
GNA Alutech Inc	1224
Giesel Verlag GmbH	1304
Gillespie + Powers Inc	1111
Glama Maschinenbau GmbH	624
NV Gouda Vuurvast	1037
Granutech Saturn Systems Corp	431
Graphite Engineering & Sales	835
GVI	1221
Hamilton Research & Technology	1213
Hauck Manufacturing Co	1139
Hencon BV	1131
Hereaus Electro-Nite Co	1205
H. G. Engineering	933
Holcan Construction	731
Holton Machinery Ltd	725
Hydro Aluminium HyCast AS	823
Hysitron Inc	1334
Stein Atkinson Stordy Ltd.	509
IMS	739
Industrial Tip	934
Insulation & Machining Svcs Ltd	739
Intl Magnesium Assn	1319
Jayne Industries	631
Jervis B Webb Intl Co	1021
KB Alloys Inc	724
KBM Affilips BV	1309
Kabert Industries	1022
KEMPE International	1216
Kvaerner Process Technology AG	722
LAR	1125
LECO Corporation	1317
Lechler Inc	735
Light Metal Age	727

COMPANY	BOOTH #
LMI Selcom	1330
LOI Inc	1031
Loma Machine Mfg Inc	1127
MDN/Air Hydro Power	1316
Maerz-Gautschi GmbH	1105
MagChem	932
Master Alloys Co	1313
McAllister Mills	1200
Megaquip Ind Ltd	530
Messe Dusseldorf	623
Metal Bulletin	1212
Metallurg Canada Ltd	1011
The Metallurgical Society of CIM	1320
Metaullics Systems Co	711
Mid-Mountain Materials	1324
Mikropul	539
Milward Alloys Inc	1311
Minteq International Inc	1235
Modern Metals Magazine	1420
Molten Metal Equipment Innov Inc	1038
Moltech	632
Murlin Chemical Inc	923
Nalco Chemical Company	905
National Refractories & Mineral Corp	606
Niton Corp	1032
Noell Crane & Service Inc.	911
NORSMELT	931
North American Mfg Co	601
Oak Ridge National Laboratory	1305
Opsis Inc	1321
Parker Hannifin	1225
Pechiney Group	817
Plibrico	521
Port of Longview	1223
Precimeter Inc	938
Premelt Systems Inc	1338

COMPANY	BOOTH #
Procedair Industries	611
Pryor Giggey Co	1300
Pyrotek Inc	1001
R&D Carbon	718
Rex Roto Corporation	917
Saint Gobain Industrial Ceramics	517
SMV	1239
SWS Scharf Westfalia GmbH	930
Selee Corporation	701
Sentech Corporation	1017
SERMAS Industrie	1121
SETARAM	523
Silver Needle Inc	1325
SKAMOL	1124
STAS	1116
Stein Atkinson Stordy Ltd.	509
Stellar Materials	1231
Techmo Car & Engineering	1209
Thermal Ceramics	1004
Thermcon Ovens BV	630
ThermoARL	621
Thermo Radiometrie Corp	1416
Thorpe Technologies Inc	607
UES Software Inc	1312
Unifrax Corp	839
Unisearch Associates Inc	1010
U S Department of Energy	1301
VAW Aluminium Technologie GmbH	1230
Vesuvius	1101
Vulcan Refractories	834
Wagstaff, Inc	801
Western Industrial Ceramics	1136
Wienalco	1238
Zircar Ceramics Inc	1217



LOCATION
The TMS 2002 Annual Meeting & Exhibition will take place in Seattle, Washington. The Sheraton Seattle Hotel and Towers will be the headquarters hotel for the event. All conference events, including registration, technical sessions, and the exhibition will take place at the Washington State Convention and Trade Center.

REGISTRATION POLICY
All attendees and authors must register for the meeting. Non-member authors may register at the special non-member author rate. Badges are required for admission to all technical sessions, the exhibition, and social functions.

REGISTER VIA TMS ONLINE
You may register any time, day or night, via the TMS 2002 Annual Meeting & Exhibition Home Page on the World Wide Web at http://www.tms.org/Meetings/Annual-02/AnnMtg02Home.html. TMS On-Line also provides detailed information on this and all TMS sponsored conferences.

ADVANCE REGISTRANT PACKET PICK UP
Advance registrants should pick up their registration packets at Hall 4C in the Washington State Convention and Trade Center during the registration hours. Full payment of registration fees and social function tickets must accompany the completed Advance Registration form.

AT MEETING REGISTRATION
Registration will be held in Hall 4C in the Washington State Convention and Trade Center during the following hours:

Sunday, February 17	11:00 am-6:00 pm
Monday, February 18	7:00 am-5:00 pm
Tuesday, February 19	7:00 am-5:00 pm
Wednesday, February 20	7:00 am-5:00 pm
Thursday, February 21	7:00 am-10:00 am

FOR QUESTIONS ON ADVANCE REGISTRATION, PLEASE CONTACT:
TMS Meeting Services, 184 Thorn Hill Road • Warrendale, PA 15086
Telephone: (724) 776-9000, ext. 243 • Fax: (724) 776-3770
E-mail: mtgserv@tms.org

TECHNICAL SESSIONS
Technical sessions will begin on Monday, February 18, 2002 and end on Thursday, February 21, 2002. Technical sessions will be held at the Washington State Convention and Trade Center. Abstracts will be printed in the November 2001 issue of *JOM* and will also be available via TMS OnLine on the World Wide Web at http://www.tms.org/Meetings/Annual-02/AnnMtg02Home.html.

EMPLOYMENT REFERRAL BOARD
An employment referral board will be located at the TMS Member Services Desk. Attendees may leave their resumes and employers may post job openings. Also look for the tabletop display promoting the TMS BrassRing Resume Referral Service.

GUEST HOSPITALITY
A special guest hospitality area will be hosted each day of the meeting from 7:00 am - 10:00 am in the Sheraton Seattle Hotel and Towers. TMS will sponsor a continental breakfast for the convenience of spouses and accompanying persons of meeting attendees. The Guest Hospitality Room will be a good place to meet, socialize, and gather for tour departures.

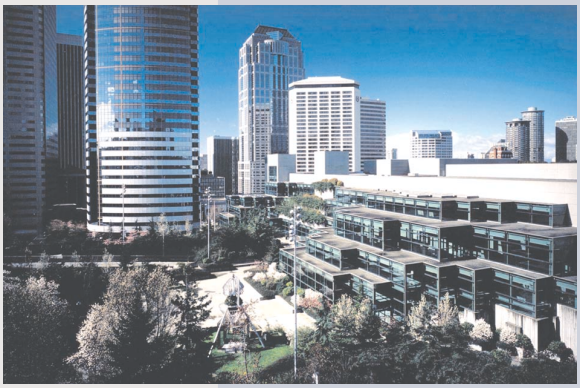
To "register" an accompanying person, please provide your guest's name on your meeting registration form. They will receive a complimentary badge identifying them as a Conference Guest, which will allow admission to the TMS Exhibition and Reception, and the Guest Hospitality Room.

Note: The Conference guest badge is intended for spouses and accompanying persons of registered attendees and for identification only. It does not permit access to technical presentations.

POSTER SESSION
A technical, noncommercial poster session will be held in conjunction with the 2002 Annual Meeting. Presentations will be displayed on 4x8-foot poster boards; no formal presentation is required. Individuals should refrain from the use of brand names and specific product endorsements. The Poster Session will begin on Monday, February 18 and remain in place through Wednesday, February 20. Abstracts of 150 words or less must be submitted to the Conference Management System (CMS) at http://cms.tms.org by January 5, 2002. If you do not have access to the World Wide Web, abstracts may be mailed to: Charlotte Kobert, TMS, 184 Thorn Hill Road, Warrendale, PA 15086, Fax: (724)776-3770.

ADVANCE REGISTRATION
Take advantage of the discounted advance registration fees. Complete the TMS Annual Meeting Advance Registration form in this brochure and return it to TMS no later than January 28, 2002. Advance registration is encouraged. For your convenience, you may charge your registration fees on MasterCard, VISA, American Express, or Diner's Club credit cards. Full payment of registration fees and social function tickets must accompany the completed Advanced Registration form. Complete the registration form in this brochure and mail or fax it today.

Advance Registration Deadline: January 28, 2002



EASY REGISTRATION PROCESS

IF YOU ARE REGISTERED IN ADVANCE (Advance Registration is Recommended)...
-Have your meeting registration confirmation/receipt letter, TMS membership card, or your business card ready when you pick up your registration packet.
-Proceed directly to the Advance Registration area located in Hall 4C at the Washington State Convention & Trade Center and go to the registration desk that is marked with the first letter of your last name. A friendly meetings representative will provide you with your name badge and meeting packet.

IF YOU PLAN TO REGISTER AT THE MEETING...
-You must complete a Meeting Registration Form. Forms will be available in the meeting registration area at the Washington State Convention & Trade Center.
-Proceed directly to the On-Site Registration Counter where a friendly meetings representative will process your payment and registration form. The representative will print your name badge and provide you with your meeting packet, as well as print your receipt.

AMERICANS WITH DISABILITIES ACT

TMS strongly supports the federal Americans with Disabilities Act (ADA) which prohibits discrimination against, and promotes public accessibility for those with disabilities. In support of and compliance with this Act, we ask that those requiring specific equipment or services as an attendee of the TMS Annual Meeting, contact the TMS Meeting Services department and advise of any specific requirements in advance.

AUDIO/VIDEO RECORDING POLICY

TMS reserves the right to any audio and video reproduction of all presentations at every TMS-sponsored meeting. Recording of sessions (audio, video, still-photography, etc.) intended for personal use, distribution, publication, or copyright without the express written consent of TMS and the individual authors is strictly prohibited. Contact the TMS Technical Programming Department to obtain a copy of the waiver release form.

TRANSPORTATION

Metro's Convention Place Station is a convenient hub for many bus routes and is located just one block north of the Convention Center on 9th Avenue at Pine Street. It is one of five stops along the electric bus tunnel that serves downtown Seattle. Metro bus rides are free within a designated downtown area. For Metro information, call (206)553-3000 for the bus route that will take you to your hotel or directly to the Convention Center.

HOUSING ACCOMMODATIONS

The TMS headquarters hotel will be the Sheraton Seattle Hotel and Towers. Special conference rates have been contracted at all the hotels listed on the housing form found in this brochure. To receive the special convention rate, please use the enclosed form to make your hotel reservation. **Hotel reservations are processed on a first-come, first-served basis until January 18, 2002.**

ABOUT THE SHERATON SEATTLE HOTEL AND TOWERS

Located in the city's vibrant core, the best of Seattle is just outside the front doors. World class shopping lies in all directions, dazzling nightlife beckons, and you could dine forever on fresh, Northwest cuisine.

Sheraton Seattle Hotel and Towers offers a special dining experience for each person, including Fullers, a four-star dining room, recently voted Seattle's top restaurant by the readers of Gourmet magazine. You can also visit the Oyster Bar for fresh seafood, Schooners Bar for pub fare and big screen sports, or the Pike Street Café which serves breakfast, lunch, and dinner.

The Sheraton's recreation facilities encompass a health club located on the 35th floor that includes an indoor, heated pool, co-ed sauna, whirlpool, and workout room with exercise equipment.

U·S AIRWAYS

Official Carrier of the TMS 2002 Annual Meeting & Exhibition

US Airways agrees to offer an exclusive low rate for the attendees traveling to the TMS 2002 Annual Meting & Exhibition in Seattle, Washington. Offer applies to flights from all points on US Airways Route System via Seattle, Washington.

This special fare will offer a 7% discount off First or Envoy Class and any published US Airways promotional round trip fare. A 12% discount off unrestricted coach fares will apply with a seven-day advance reservation and ticketing required. Plan ahead and receive an additional discount by ticketing 60 days or more prior to departure. These discounts are valid provided all rules and restrictions are met and are applicable for travel from all points on US Airways' route system.

US Airways will also offer exclusive negotiated rates for attendees who are unable to meet the restrictions of the promotional round trip. Certain restrictions, including advance purchase requirements, may apply. These special rates are applicable for travel from the continental United States.

The above discounts are not combinable with other discounts or promotions, and are valid three days before and after the meeting dates. Additional restrictions may apply on international travel.

To obtain these discounts, you or your professional travel consultant must call US Airways' Group and Meeting Reservation Office toll free at (877) 874-7687; 8:00 am – 9:30 pm, Eastern Time.

REFER TO GOLD FILE NO. 14192113

Once your reservations are confirmed, we will mail the tickets to you or suggest several other convenient methods of purchase.

If you normally use the services of a travel agent or corporate travel department, please have them place the call so that they may obtain the same advantages for you. The special meeting fare is only available through the US Airways Group and Meeting Reservation Office.

Hertz®

Official Car Rental Company of the TMS 2002 Annual Meeting & Exhibition

Meeting rates listed below, with free unlimited mileage, are guaranteed one week before through one week after the actual meeting dates and are subject to availability. Rates are available from all Seattle locations.

For Hertz reservations, call 1-800-654-2240 in the US; 1-800-263-0600 in Canada; International - contact your nearest Hertz reservation center. **Identify yourself as an attendee of the TMS Annual Meeting & Exhibition and reference the following CV number: CV#02QJ0001.** You must give the reservations agent the Hertz CV# to receive the special rates. Advance reservations are recommended.

CAR CLASS	DAILY Per Day	WEEKEND Per Day	WEEKLY 5-7 Day
A Economy 2DR	$34.99	$23.99	$159.99
B Compact 4DR	$44.99	$26.99	$174.99
C Midsize 2/4DR	$48.99	$29.99	$189.99
D Sporty 2DR	$49.99	$32.99	$199.99
F Full-size 4DR	$51.99	$34.99	$204.99
G Premium	$55.99	$39.99	$234.99
I Towncar	$79.99	$69.99	$324.99
L 4-Wheel Drive	$59.99	$59.99	$299.99
R Minivan	$59.99	$59.99	$299.99

Terms and Conditions:

- UNLIMITED MILEAGE ALLOWANCE ON ABOVE RATES.
- One-way service fee will apply when cars are not returned to renting location.
- Additional daily charges for optional coverage (Loss Damage Waiver, Personal Accident Insurance, Personal Effect Protection, refueling and state tax) are not included in the above rates.
- Drivers must meet standard Hertz age, driver, and credit requirements.
- Hertz is a frequent flyer partner with US Airways, Delta, Northwest, United, and American Airlines. Frequent flyer information may be requested at time of car booking.

BOEING 747/767/777 PLANT TOUR

The Boeing Company has become synonymous with air transportation through major advancements in the aeronautical industry with their 747, 767, and 777 aircrafts. As pioneers in the "Age of Flight", Boeing invites you to tour their enormous technical center. A film presentation will inform you of their historical beginnings, present work, and future goals. You will then embark on a unique tour of the building and view the diligent assembly process. The building, the largest (by volume) in the world, is heated in the winter solely by body heat and the machines in use! You will view the 747's in various stages of production from fuselages to near completion as they are rolled from each assembly point. This private tour will open your eyes to future technology and the aircraft of today and tomorrow.

Thursday, February 21, 2002
9:30 am – 12:30 pm
Price per person: $39.00

Roundtrip transportation will depart from the Washington State Convention and Trade Center. Children must be over 50" in height to participate in the tour. No cameras or hand-held items (including purses) allowed on the tour.

DESTINATION HIGHLIGHTS

Convention Services Northwest has been designated the official tour company of TMS and has scheduled the following tours for your enjoyment. Tours will depart from the Washington State Convention and Trade Center. You may reserve the tour of your choice in advance by completing the enclosed registration form. DO NOT MAIL THE FORM TO TMS. Please complete the form and mail or fax along with payment to: Convention Services Northwest, Tower Building/Suite 1414, 1809 Seventh Avenue, Seattle, WA 98101. Tickets will not be mailed in advance. Upon arrival in Seattle, your tickets will be ready for you to pick up at the Tour Desk located near the conference registration desk at the Washington State Convention and Trade Center. In order to guarantee operation of tours, please make your reservation before coming to Seattle.

Sample Seattle – A Deluxe City Tour

Monday, February 18, 2002
9:00 am – 12:30 pm
$28.00 per person

Come sample Seattle. This tour provides an overview of the many attractions Seattle offers its visitors. The tour will drive along the waterfront with its import shops and fresh seafood restaurants, into historic Pioneer Square. This area, one of Seattle's oldest, features early 1900's architecture, much of which has been renovated into wonderful art galleries and specialty shops. Next is the International District, the third largest on the West Coast. Evidence of the Pacific Rim cultural influence abounds there, even the streetlights have an Asian style. The tour continues along Lake Washington to the University of Washington campus. Continuing on, the first stop will be the Hiram Chittenden Locks and Salmon Ladder. The locks are an engineering feat, which connect saltwater Puget Sound with freshwater Lake Union. The salmon ladder features the seasonal migration of salmon returning to their parent streams to spawn. Next, travel to Magnolia Bluff where the views of Puget Sound are breathtaking. This precedes the last stop, the world famous Pike Place Farmers market. Vendors from all around the region come to the market to showcase their wares. You'll have the opportunity to browse and hopefully find a perfect souvenir of your trip to the Emerald City.

Historic Port Townsend Day Trip

Tuesday, February 19, 2002
9:00 am – 4:30 pm
$59.00 per person – includes box lunch

Climb aboard and enjoy your trip to historic Port Townsend, a town made famous by "An Officer and A Gentleman", as well as the highly acclaimed novel "Snow Falling on Cedars". The first part of the trip will be a cruise across Puget Sound on a Washington State ferry, part of the largest inland ferry system in the world. Enjoy a narrated, scenic drive through the Kitsap Peninsula, along Puget Sound and through lush forest, on your way to the Olympic Peninsula. Once in Port Townsend, a drive through the historic district will show off its restored collection of brick and stone buildings dating back to the late 1800's. Settled in the 1850's, Port Townsend was the prospering main port of entry to Puget Sound. Lunch can be enjoyed in many areas of the waterfront park. There will be time to browse the antique shops, art galleries, and boutiques at your own pace before returning to Seattle.

Wine Tasting Tour

Wednesday, February 20, 2002
1:00 pm – 5:00 pm
$39.00 per person

Just North of Seattle, in the small town of Woodville, resides many premier wineries of the Pacific Northwest. The tour will begin at Chateau Ste. Michelle, Wine Country Magazine's "Best of the Best American Wineries" Platinum winner. You will tour through the cellars of Chateau Ste. Michelle and view the wine making process. In the tasting room, tasting will be demonstrated with selected wines to sample. Also named in Wine Country Magazine's "Best of the Best American Wineries", nearby Columbia Winery is the next stop. Columbia has become nationally known for its full-bodied red wines as well as many enjoyable white wines.

WEB Take advantage of the convenience of on-line pre-registration via the TMS website: **http://www.tms.org** Web registration requires credit card payment.

FAX Fax this form to TMS Meeting Services **USA 724-776-3770** Fax registration requires credit card payment.

MAIL **Return this form with payment to** Meeting Services TMS 184 Thorn Hill Road Warrendale, PA 15086

TMS2002
131st Annual Meeting & Exhibition

Advance Registration Deadline: January 28, 2002
Payment must accompany form.
Forms received past this date will be processed at the on-site fee.
INSTRUCTIONS: Check your selections and fill in the necessary information. *Please print or type.*

AM02-PDF

Member of: ☐ TMS ☐ ISS ☐ SME ☐ SPE Member Number: _____

This address is: ☐ Business ☐ Home Employer/Affiliation: _____

☐ Dr. ☐ Prof. ☐ Mr. ☐ Mrs. ☐ Ms. Title: _____

_____
LAST NAME FIRST NAME MIDDLE INITIAL

Address: _____

City: _____ State/Province: _____ Zip/Postal Code: _____ Country _____

Telephone: _____ Fax: _____
COUNTRY AREA/CITY LOCAL NUMBER COUNTRY AREA/CITY LOCAL NUMBER

E-Mail Address: _____ Guest/Spouse Name: _____
GUESTS DO NOT RECEIVE ADMISSION TO TECHNICAL SESSIONS.

Registration Fees:

	Advance Fees (until 1/28/02)	On-Site Fees (after 1/28/02)
☐ Member	$395 M	$495 ML
☐ Non-Member Author	$395 NMA	$495 NMAL
☐ Non-Member *	$520 NM	$620 NML
☐ Student Member ##	$0 STU	$0 STUL
☐ Student Non-Member ## *	$25 STUN	$25 STUNL
☐ TMS Retired Member	$220 RM	$220 RML
☐ Exhibit Booth Personnel	$0 E	$0 EL
☐ Exhibit Only	$35 EO	$35 EOL

* Includes TMS membership for 2002
Students must attach a copy of their school's student identification card.

Publication Orders:

ALL pre-ordered books not indicated for shipment MUST be picked up at the Publications Sales area in the convention center.

Qty.	Order Number and Title	Book Price	Shipping*	Total
___	#514X CALPHAD and Alloy Thermodynamics	$72	+_____	=_____
___	#5158 Creep Deformation: Fundamentals and Applications	$105	+_____	=_____
___	#5166 EPD Congress 2002	$96	+_____	=_____
___	#5182 High-Cycle Fatigue, the David L. Davidson symposium	$110	+_____	=_____
___	#5190 Light Metals 2002 (Book and CD-ROM set)	$158	+_____	=_____
___	#5247 Magnesium Technology 2002 (Book and CD-ROM set)	$111	+_____	=_____
___	#5204 Science and Technology of Interfaces, International Symposium in Honor of Dr. Bhakta Rath (PDF)	$122	+_____	=_____
___	#5255 Sulfide Smelting 2002	$70	+_____	=_____
___	#5212 Surface Engineering: Science and Technology II (PDF)	$111	+_____	=_____
___	#5220 High-Performance Metallic Mat'ls for Cost-Sensitive Applications (PDF)	$117	+_____	=_____
___	#5239 Ultrafine Grained Materials II	$125	+_____	=_____
___	#5131 Computational Modeling of Materials Minerals, and Metals Processing	$129	+_____	=_____

* Shipping: in the United States–$10 per item • all other countries–$20 per item

Tutorial Luncheon Lecture Tickets

Optional Box Lunches	Fee	No.	Total
Monday 2/18/02 (sponsored by Young Leaders)			
Young Leaders Tutorial Box Lunch	$25	_____	$_____

Refund policy: Written requests must be mailed to TMS, post-marked no later than January 28, 2002. A $50 processing fee will be charged for all meeting registration cancellations in addition to all short course registrations cancellations.

Continuing Education Short Courses:

	Advance Fees (until 1/28/02)	On-Site Fees (after 1/28/02)
Aluminum Smelter Cell Dynamics		
☐ Member	$645	$695
☐ Non-Member	$735	$785
Texture and Anistrophy for the Materials Professional		
☐ Member	$395	$475
☐ Non-Member	$445	$525
Computational Modeling Techniques and Applications for Materials Processing		
☐ Member	$395	$475
☐ Non-Member	$445	$525

Social Function Tickets:

	Fee	No.	Total
Monday 2/18/02			
Bhakta Rath Honorary Dinner	$60	_____	$_____ RD
Charles McMahon Honorary Dinner	$60	_____	$_____ MD
David L. Davidson Honorary Dinner	$35*	_____	$_____ DD
* A portion of each ticket is being subsidized by the organizing committee			
Tuesday 2/19/02			
TMS Banquet	$60	_____	$_____ AD
Tables of 8	$480	_____	$_____ AD8
Table Sign to Read _____			
Extraction & Processing Division Luncheon	$30	_____	$_____ EP
Tables of 8	$240	_____	$_____ EP8
Table Sign to Read _____			
Wednesday 2/20/02			
Light Metals Division Luncheon	$30	_____	$_____ LM
Tables of 8	$240	_____	$_____ LM8
Table Sign to Read _____			

Plant Tour:

Thursday 2/21/02	Fee	No.	Total
Boeing 747/767/777	$39	_____	$_____BT

2002 Membership Dues—for current TMS members only:

☐ Full Member	$90 FM
☐ Junior Member	$55 JM
☐ ASM/TMS Joint Student Member	$25 ST

TOTAL FEES PAID ..... $_____

Payment enclosed:

☐ Check, Bank Draft, Money Order

Make checks payable to TMS. Payment shall be made in US dollars drawn on a US bank.

☐ Credit Card Expiration Date: _____

Card No.: _____

☐ Visa ☐ MasterCard ☐ Diners Club ☐ American Express

Cardholder Name: _____

Signature: _____

TMS2002
131st Annual Meeting & Exhibition

February 17-21, 2002 • Seattle, Washington, USA

Making your reservation is easier than ever through Travel Planners' real-time Internet reservation system! Just log on to www.tms.org, and follow the link to Travel Planners. You will be able to view actual availability, learn about your hotel's features and services, and obtain local city and sightseeing information. Most importantly, you will receive instant confirmation of your reservation!

Or, mail or fax this housing form to:
Travel Planners, Inc., 381 Park Ave. South,New York, NY 10016
FAX: 212-779-6128 • PHONE: 800-221-3531, ext. 1 (in 212, 718, 516, 914, 631 or international call 212-532-1660, ext. 1)
(CHOOSE ONLY ONE OPTION)

Reservations must be received at Travel Planners by: January 18, 2002

Arrival Date _____ Departure Date _____

Last Name _____ First Name _____ MI _____

Company _____

Street Address _____

City _____ State/Country _____ Zip/Postal Code _____

Daytime Phone _____ Fax _____

Additional Room Occupants _____

E-mail _____ (confirmation will be sent via e-mail if address is provided)

Non-Smoking Room Requested _____ Special Needs _____

 # after hotel correspondes with map below.

HEADQUARTERS
Sheraton Hotel • 1
$175/single • $175/double

W Hotel Seattle • 7
$179/single • $199/double

Renaissance Madison • 5
$149/single • $149/double

West Coast/Grand • 8
$135/single • $135/double

Hilton Seattle • 3
$140/single • $140/double

Mayflower Park Hotel • 4
$140/single • $140/double

West Coast/Roosevelt • 9
$132/single • $132/double

Westin Seattle • 11
$165/single • $165/double

Crowne Plaza Seattle • 2
$134/single • $134/double

Summerfield Suites Wyndham • 6
$119/single • $129/double

West Coast/Vance • 10
$125/single • $125/double

Indicate 1st, 2nd, & 3rd hotel choice:

1. _____
2. _____
3. _____

Type of Accomodations: (check one)
☐ Single 1 person/1bed ☐ Double 2 people/1bed ☐ Twin 2 people/2 beds
☐ Triple 3 people/2 beds ☐ Quad 4 people/2 beds

If all three (3) requested hotels are unavailable, please process this reservation according to: (check one) ☐ ROOM RATE ☐ LOCATION

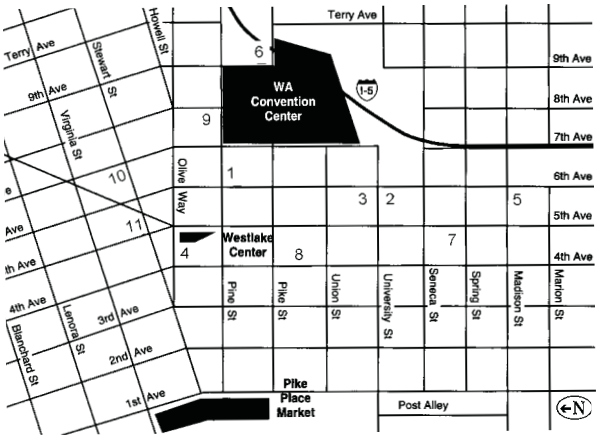
TMS has contracted a block of rooms at the headquarters hotel, Sheraton Seattle Hotel & Towers, along with each of the hotels, and therefore has assumed a financial liability for any and all rooms in that block that are not reserved. You are strongly encouraged to reserve your room(s) at the hotels listed to limit our financial liability. Please help TMS achieve overall success with the 131st TMS Annual Meeting & Exhibition by making your reservation at one of the listed hotels prior to the advance housing deadline. Thank you.

Confirmations: Confirmation will be e-mailed, faxed or mailed to you from Travel Planners, Inc. once your reservation has been secured with a deposit. You will not receive a confirmation from your hotel. If you do not receive a confirmation within 7 days, please call Travel Planners, Inc.

Changes/Cancellations: All changes and cancellations in hotel reservations must be made with Travel Planners, Inc. up until 3 business days prior to arrival and are subject to the individual hotel's cancellation policies. Cancellations and changes within 3 days of arrival MUST be made with your hotel directly. Many hotels are now imposing fees for early departure. This rate is set by each hotel and may vary accordingly. Please reconfirm your departure date at the time of check-in.

Reservations/Deposits: All reservations are being coordinated by Travel Planners, Inc. Arrangements for housing must be made through Travel Planners, Inc. and NOT with the hotel directly. Reservations via Internet, phone or fax will be accepted with a major credit card only. Housing forms and written requests will be accepted with a major credit card or deposit of one night's room and tax payable to Travel Planners, Inc. Check must be drawn in US funds on a US bank. No wire transfers will be accepted. Deposit policies are set by each hotel, and are outlined on your hotel confirmation.

Please read all hotel information prior to completing and submitting this form to Travel Planners, Inc. Keep a copy of this form. Use one form per room required. Make additional copies if needed.



Payment enclosed: ☐ Check ☐ American Express ☐ MasterCard ☐ VISA ☐ Discover ☐ Diners

Account Number _____ Expiration Date _____

Card Holder Name _____ Authorized Signature _____

TMS2002
131st Annual Meeting & Exhibition

February 17-21, 2002 • Seattle, Washington, USA

Convention Services Northwest has arranged tours for attendees/guests.

Please make your reservation by noting choice of tour. Pre-sold tickets will be held at the tour desk located in Hall 4C of the Washington State Convention and Trade Center. Please arrive 15 minutes prior to departure time.

Registration:

To register for the tours, please complete and return the registration form along with full payment to:
Convention Services Northwest, Attn: Becky Haiduck
Tower Building/Suite 1414,1809 Seventh Avenue, Seattle, WA 98101, USA
PHONE: (206) 292-9198 • FAX: (206) 292-0559
*** PLEASE CHOOSE ONLY ONE OPTION FOR SENDING FORM ***

Description	Date/Time	Price	No.	Amount
Sample Seattle – A Deluxe City Tour	Monday, February 18, 2002 – 9:00am-12:30pm	$28	_____	$_____
Historic Port Townsend Day Trip	Tuesday, February 19, 2002 – 9:00am-4:30pm	$59	_____	$_____
Wine Tasting Tour	Wednesday, February 20, 2002 – 1:00pm-5:00pm	$39	_____	$_____

Total $_____

Last Name _____ First Name _____ MI _____

Street Address _____

City _____ State/Country _____ Zip/Postal Code _____

Daytime Phone _____ Fax _____

E-mail _____

☐ I have special needs, disabilities or dietary concerns. Please have someone from Convention Services Northwest contact me.

Payment options:

☐ Check or Money Order Enclosed (remit in US funds)

☐ American Express ☐ MasterCard ☐ VISA ☐ Discover ☐ Diners

Account Number _____ Expiration Date _____

Card Holder Name _____ Authorized Signature _____

Reservations:

Reservations must be received by January 16, 2002. Tickets may be purchased on-site on a space-available basis only and tickets will include an additional $2.00 charge. You may pick up your tickets at the Washington State Convention and Trade Center in Hall 4C staring at 11:00am on Sunday, February 17, 2002.

Refunds:

Refunds for cancellations will be made if written request is received at the Convention Services Northwest office by January 16, 2002, less a $5.00 handling fee per ticket. After January 16, 2002, no refunds or exchanges can be made. If minimum registration on a tour is not met, Convention Services Northwest will refund the cancelled tour or apply the refund towards another tour.

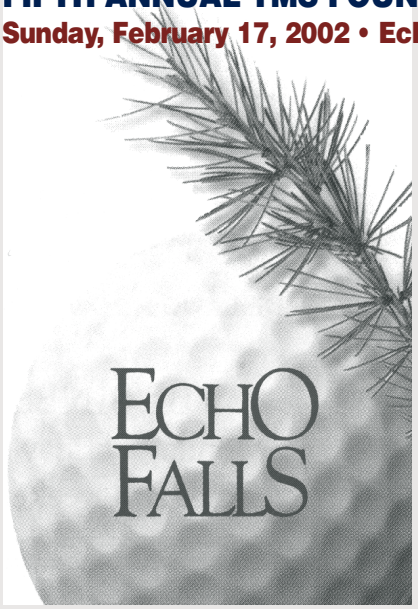
For Office Use Only:

Deposit No. _____ Amount $ _____

Check No. _____ Inn. _____

FIFTH ANNUAL TMS FOUNDATION GOLF CLASSIC

Sunday, February 17, 2002 • Echo Falls Golf Course • Snohomish, Washington



TMS FOUNDATION

A fun and exciting event benefiting students and young engineers through the TMS Foundation!

The TMS Foundation Golf Classic has become one of the most anticipated events associated with the TMS Annual Meeting and Exhibition. Taking place on some of the country's most beautiful and well known golf courses, it is the perfect social event to kick-off your week.

Echo Falls Country Club continues the TMS Foundation Golf Classic's tradition of quality venues. The premier tournament course in the Puget Sound area will impress you as soon as you drive through the entrance and approach the English Tudor clubhouse. This spectacular course fits into the Washington countryside and is enjoyable but challenging. You can use every club in your bag. The beautiful eighteenth hole lies on an island directly in front of the clubhouse. There is an ample green, but if you miss, you're in the water.

Tournament play will be a scramble format with teams of foursomes. There will be a shotgun start at 8:30 a.m. Prizes will be awarded for longest drive, both men's and ladies', and closest-to-the pin contests, as well as a random drawing for door prizes. A Hole-in One Contest with a $10,000 grand prize is also planned.

Join us for this great outing and help support the future of materials science and engineering.

FEES: All fees include bus transportation to and from the course, green fees, carts, continental breakfast, refreshments, and a post-tournament luncheon.

TOURNAMENT FEE: $160 per golfer; $575 per foursome

THE REGISTRATION DEADLINE IS: January 28, 2002, however the field is limited, so register today!

NOTE: Written cancellations must be received prior to January 28, 2002. No refunds will be issued after January 28, 2002. A $30 processing fee will be charged on all cancellations.

Sponsorship opportunities are available. Please contact Cindy Wilson at (724) 776-9000, ext. 231; or e-mail at wilson@tms.org.

2002 TMS FOUNDATION GOLF TOURNAMENT REGISTRATION FORM

CHECK ONE: ☐ INDIVIDUAL GOLFER $160 (INDIVIDUALS WILL BE ASSIGNED TO A FOURSOME) ☐ FOURSOME $575

NAME _____ HANDICAP/AVG. SCORE _____

ORGANIZATION _____ ADDRESS _____

CITY _____ STATE _____ COUNTRY _____

ZIP/POSTAL CODE _____ TELEPHONE _____

FAX _____ E-MAIL _____

IF REGISTERING AS A FOURSOME, THE OTHER GOLFERS ARE

1. _____ HANDICAP/AVG. SCORE _____

2. _____ HANDICAP/AVG. SCORE _____

3. _____ HANDICAP/AVG. SCORE _____

METHOD OF PAYMENT: PAYMENT MUST ACCOMPANY REGISTRATION

☐ CHECK OR MONEY ORDER ☐ CHARGE MY: ☐ VISA ☐ MASTERCARD ☐ AMERICAN EXPRESS ☐ DINERS CLUB

ACCOUNT NUMBER _____ EXPIRATION DATE _____

CARDHOLDER'S NAME _____ SIGNATURE _____

SEND TO: TMS FOUNDATION, 184 THORN HILL ROAD, WARRENDALE, PA 15086-7528; FAX: (724) 776-3770