short course

TMS2012
141st Annual Meeting & Exhibition

March 11 – 15, 2012 • Walt Disney World Swan & Dolphin Resort • Orlando, Florida

Process Energy Modeling: *Spreadsheets and Beyond*

Sunday, March 11, 2012 • 8:30 a.m. – 4 p.m.

Member fee: **$475**
Late Member fee: **$550**
Nonmember fee: **$525**
Late Nonmember fee: **$600**

Course Description and Objectives:
Energy efficiency and conservation are common themes in TMS meetings, and never more so than in the current national emphasis on the subjects. This course provides a thorough explication of techniques for energy balance calculations in the production, utilization, conservation, and conversion of energy in materials processing. The emphasis is on teaching by examples, and relies heavily on the use of Excel and Excel-based tools for a database and balance calculations. Course material includes a thermodynamic database, unit and stream conversion software, and a flowsheet-modeling program developed especially for teaching simulation fundamentals. Registrants will be provided with software programs for making material and energy balances for a variety of material processes, templates for specific applications such as natural gas combustion, and keyed-in references to a recently published TMS/Wiley text, "Handbook on Material and Energy Balance Calculations in Material Processing", 3rd Edition, 2011, by Arthur Morris, Gordon Geiger, and H. Alan Fine. The course will also deal with more complex energy balance calculations that require the use of commercial software programs.

Who should attend:
1. Practicing engineers, whose background lies outside the process energy area, and who want to gain a better understanding of the fundamentals of making material and energy balances using Excel or other software tools.
2. Practicing engineers who use second-party templates for making specific heat balance calculations, and would like to be able to develop their own templates in Excel.
3. Practicing engineers who would like to experiment with specially-designed process flowsheeting software for making material and energy balances.
4. Newer engineers who are asked to take on the job of evaluating energy use in a plant or process, and suggest ways to minimize it.
5. Students who want to prepare themselves for jobs in locations where energy production and conservation are important. Students should email Louise Wallach, lwallach@tms.org at TMS for a possible discount.

Instructors:
Dr. Arthur E. Morris
Professor Emeritus of Metallurgical Engineering, Missouri University of Science and Technology

Dr. David Robertson
Professor Emeritus of Metallurgical Engineering, Missouri University of Science and Technology

Dr. Eric Grimsey
Professor of Metallurgical Engineering, Curtin University, Western Australia School of Mines

HANDBOOK ON

Material and Energy Balance Calculations in Materials Processing 3RD EDITION

Arthur E. Morris • Gordon Geiger • H. Alan Fine

ISBN: 9781118065655 / June 2011 / $ 149.95 / 600 pages / Cloth

The only material/heat balance book for materials processing applications

This completely revised Third Edition provides a clear, comprehensive treatment of the use of mass balance and stoichiometry techniques, and the application of the First Law of Thermodynamics, to the production and processing of mineral, metallic, and ceramic materials. The text comes with a CD containing an extensive thermodynamic database, specially-developed software to carry out more complex calculations, and a bonus set of flowsheeting notes by Dr. Eric Grimsey of Curtin University, Australia. Coverage includes the steps between the initial treatment of ores and scrap to the production of advanced materials, with extensive use of worked examples and case studies. The emphasis on recycling, energy conservation, and efficient use of materials and energy makes this book an essential resource for anyone interested in materials processing.

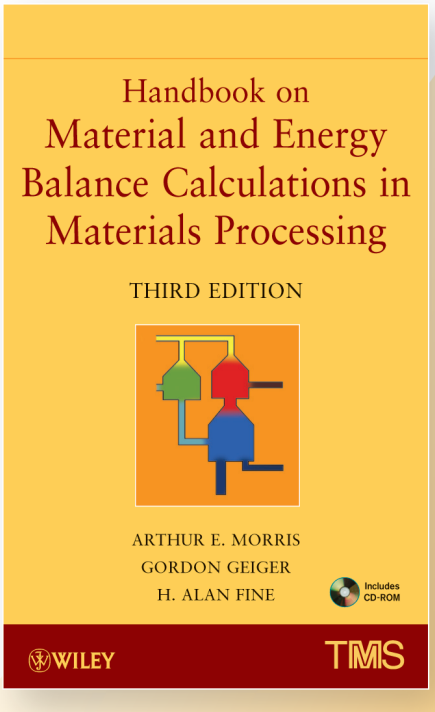
Key Topics in the Third Edition:

- Introduction to flowsheets, their presentation, and techniques for flowsheet analysis
- The statistics of measurement and sampling, regression analysis of data, and experimental design
- The use, optimization, and conservation of energy in materials processing
- Combustion, flame temperature, process control, and the Wobbe Index.

Key Features of the Third Edition:

- Powerful equation-solving software for multi-reactor flowsheets with recycle and bypass streams, counter-current flow, heat exchangers, and time-dependent composition changes
- The use of thermodynamic databases in the derivation of sensible heat, enthalpy of formation, and reaction equilibrium expressions
- Treatment of the AES and SI system of units, including conversion software
- Over a hundred text examples worked out in detail
- Exercises at the end of every chapter
- Analysis of five case studies

Contains a CD with software, supporting data, material properties, and supplementary documents



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