



SUBMIT AN ABSTRACT FOR THE FOLLOWING SYMPOSIUM

MATERIALS SYNTHESIS AND PROCESSING

Sustainable Manufacturing: The Role of AM, Powder and Particle Technologies

Sustainable manufacturing has become a critical focus area in materials science and engineering, as we strive to address pressing global issues, such as the depletion of natural resources, environmental degradation, and energy sustainability challenges.

This symposium will explore innovative approaches to sustainability in the processing of metals, ceramics, and composites, with a focus on powder- and particle-based manufacturing technologies. Of particular interest are feedstock materials synthesis, colloidal processing, conventional and novel sintering techniques, and additive manufacturing. Emphasizing energy efficiency, waste minimization, and circularity in powder-based manufacturing, this symposium will highlight advancements in novel manufacturing methods and sustainable materials, resource-efficient powder production, and strategies for enhancing recyclability. By integrating existing standards with cutting-edge technologies, sustainable design principles and novel material development, we aim to drive progress toward environmentally responsible and economically viable powder processing techniques.

This symposium will bring together perspectives from academia, industry, and research laboratories to foster discussions on sustainable innovations in powder- and particle-based technologies. Through collaborative knowledge exchange, we aim to advance practical solutions that balance technical feasibility with environmental and socio-economic responsibility.

Topics of interest include:

- Novel energy-saving techniques in metal, ceramic, and composite fabrication.
- Advances in conventional and novel sintering techniques for energy-efficient densification.
- Colloidal processing strategies for minimizing material waste and optimizing material microstructures.
- Advanced and Additive Manufacturing (AM) approaches to reduce material consumption and enhance recyclability.
- Green powder-based shaping techniques.
- Nature-inspired processes.
- Zero-waste manufacturing processes for advanced materials.
- Materials engineered for enhanced recyclability or biodegradability.
- Sustainable powder production, including resource-efficient synthesis and feedstock recycling.
- Digital twins and AI-driven optimization in powder-based manufacturing.

- Closed-loop recycling strategies for powder-based materials and components.
- Lifecycle analysis of powder-based products and their environmental impact.
- Connecting the environmental and the socioeconomic sustainability pillars.

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