MSE 2024

24 - 26 Sep 2024 (Darmstadt)

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Topic P: Processing and Synthesis

P06: Additive Manufacturing Technologies and Materials

Additive Manufacturing (AM), often referred to as 3D printing, has evolved from its origins as a rapid prototyping tool to a groundbreaking technology with transformative potential in various industries. While the production of innovative component geometries is very attractive to designers, additive manufacturing places strong challenges towards the materials science and engineering community. With layer-by-layer build-up, both, the component and the material, are generated at the same time in additive manufacturing. The current trend of making high quality parts by additive manufacturing therefore requires an in-depth understanding of the interaction between the AM process, its relevant processing parameters and the resulting microstructure which finally determines the properties of the component. This includes exploring as well the latest developments in AM for functional materials. The key focus topics of the symposium are including but not limited to:

- The understanding of the role of materials in these different processes, particularly with regards to microstructure, residual stresses, presence, importance and elimination of defects.
- Activities that are still necessary in order to push the technology into higher Technology Readiness Levels (TRL) for its industrialization.
- Improvements covering the whole AM value chain. This includes the development of standards for quality assessment and implementation of processes for raw material and process monitoring, AM and alloy design, modelling of residual stresses, thermal treatments and the analysis of their impact on mechanical properties and dimensional stability, finishing processes, strategies for non-destructive testing, proved repeatability on part properties, specific procurement procedures, sustainability and recycling, among others.
- Explore the innovative methodologies for designing functional materials with tailored properties. Highlight groundbreaking functional materials designed to meet specific functional requirements, including advanced polymers, metals, ceramics, composites, and biomaterials, showcasing their unique properties and potential applications.

In the framework of this symposium, the current state of the art and future trends and all aspects covering the industrialization of AM will be discussed. This symposium also provides an exceptional opportunity for academics to engage in scholarly discussions, exchange research findings, and foster collaborations that will drive the materials science field forward.

Symposium Organizer


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