

FEMS EUROMAT23

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FEMS EUROMAT is the most important international congress in materials science and technology in Europe. It continues a successful congress series promoting the transfer of knowledge and the exchange of experience between academia and industry. **Submission deadline: 31 January 2023**

Area B: Structural Materials

B04: Advanced Structural Ceramics

Advanced structural ceramics demonstrate enhanced mechanical properties under demanding conditions. They serve as structural components and are often subjected to mechanical and thermal loading, not only in structural applications in place of metals, polymers, and composites but also in functional applications.

Under erosive, corrosive, or high-temperature environments, advanced ceramics display superior wear resistance, making them ideal for tribological applications, such as mineral processing equipment, while others are chemically inert and therefore suitable for bone replacements in the highly corrosive environment of the human body. Strong covalent bonds also make some of these ceramics thermo-chemically inert and resistant to ablation, with promising use in the areas of aerospace, automotive, and power generation.

Additionally, today's growing complexity of many classes of functional ceramics poses major challenges to structural science, to which the development and the increasing predictive power of computation make key contributions. Consequently, the complexity of structural problems and the structure-function relationships are intensively studied for miniaturized applications, as well as in the functional fields of sensors, energy, and catalysis, most of the time in terms of device viability and re-usability.

All the above applications have to go beyond a number of technological barriers in order to enable the use of structural and functional advanced ceramics in everyday reality. The most significant challenges include the inherent flaw sensitivity of ceramics and the variability of their mechanical properties during use. Toughening methods, such as the engineering of microstructures that may obstruct the propagation of cracks or absorb energy during the crack propagation, or phase transformation and microcracking, or even the introduction of fiber, are research lines under continued exploration. These challenges are also tackled throughout innovative ceramic processing technologies, such as colloidal procedures, additive manufacturing, and fast/cold sintering technologies.

Therefore, the topics of the Advanced Structural Ceramics Symposium are related to:

- Processing strategies and challenges for microstructure engineering
- Ceramics and composites in extreme environmental conditions
- Structural integrity of functional ceramics
- Thermo-mechanical behavior in different extreme environments
- Predictive computational models

Symposium Organizer



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