

Symposium 3: Advanced Structural Ceramics for Extreme Environments

Advanced structural ceramics are enabling materials for applications that involve extreme environments such as those associated with nuclear power generation, turbine engines, hypersonic flight, high speed machining, and other demanding applications. The radiation levels, temperatures, heat fluxes, wear/abrasion, and other environments encountered in these applications exceed the capabilities of existing materials. Hence, new advances in the understanding of structure-property relationships and improving the performance by designing new composition/composites are needed. Some of the critical challenges to be met include thermal/chemical stability, complex shape forming, thermal shock resistance, radiation tolerance, and damage tolerance. This symposium will focus on design of new materials, processing, structure-property relationships, thermal and mechanical properties, oxidation resistance, machining and joining, and stability of advanced structural ceramics both from fundamental and application-oriented perspectives.

<PROPOSED SESSION TOPICS>

- Oxide, carbide, boride, and nitride based ceramics and composites
- MAX phases, MAB phases, MXenes, MBenes, and related compounds
- New precursors for powders, coatings, and matrix or fibers of composites
- Structure-property relationships at room and elevated temperatures
- Materials design, new compositions, and composites
- Novel processing methods (bulk, coatings and thin films)
- Novel characterization methods and lifetime assessment
- Methods for improving damage tolerance and resistance to oxidation, radiation, thermal shock, etc.
- New methods for joining and machining
- Structural stability in extreme environments (irradiation, ultrahigh temperature)

<ORGANIZERS>

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<INVITED LECTURES>

Tentative invited lecture information is posted in the following URL;

http://www.ceramic.or.jp/pacrim13/list_of_invited_speakers.html#3