

COMPUTATIONAL MICROMECHANICS OF PLASTICITY AND FAILURE IN MULTI-COMPONENT FUNCTIONAL MATERIALS

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ABSTRACT

The session is devoted to the micromechanical modelling of heterogeneous and multi-component functional materials, in particular, the description and analysis of the influence of material microstructure on the plasticity and failure of such materials. The focus is on the computational methods. The session is supposed to cover the following topics:

- scale transition methods and multi-scale approaches, both mean-field models and computational homogenization;
- computational frameworks related to functionally graded materials and other media with designed microstructures;
- modelling of microstructure evolution induced by plasticity and failure;
- efficient numerical implementation of multi-scale plasticity and failure models (model reduction techniques and other computationally efficient algorithms associated with implementation of multiscale methods in FE codes and its application to complex microstructures);
- applications to composites, polycrystals and other heterogeneous materials in inelastic range (plasticity, viscoplasticity, damage development, void growth, brittle and ductile failure).