Special Issue

Phase-Field Modeling of Damage Fracture

Message from the Guest Editors

The phase-field fracture model, which is among smeared approaches for damage, has shown great potential in predicting arbitrary crack paths in solids. In this Special Issue, we would like to invite you to share your findings in application of the PF fracture model in one or more of the following directions: modeling brittle, cohesive, and ductile fractures; fatigue and lifetime prediction; modeling of interphase; anisotropic and mixed-mode fracture in solids (e.g., crystalline materials, etc.); and multiphysics environment (e.g., considering chemical reaction and/or thermal influence, martensite phase transformation, and hydraulic fracturing, etc.). Moreover, discussion on new multiscaling techniques, including the PF fracture; fundamental studies on the concept of internal length scale and experimental calibration of the model; and numerical treatment and implementations (novel solvers, machine learning techniques for speedup, etc.) are highly encouraged. Finally, qualitative, and quantitative comparisons of the PF fracture against other methodology, such as gradient extended damage models (GED), extended FEM, peridynamics, Eigenerosion, mixed FEM, etc. is of great interest.

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Metallic materials play a vital role in the economic life of modern societies; contributions are sought on fresh developments that enhance our understanding of the fundamental aspects related to the relationships between processing, properties and microstructure – disciplines in the metallurgical field ranging from processing, mechanical behavior, phase transitions and microstructural evolution, nanostructures, as well as unique metallic properties – inspire general and scholarly interest among the scientific community.

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