MATERIALS PROCESSING

Deformation-induced Microstructural Evolution during Solid Phase Processing: Experimental and Computational Studies

Mechanical deformation can be used to modify the microstructure of metallic alloys to achieve supersaturation of solutes, nanoscale precipitate morphology, and novel phase equilibria, all of which in turn can be leveraged to achieve improved mechanical properties. Deformation of materials also leads to the generation of many defects ranging from vacancies, dislocations, stacking faults, sub-grain boundaries, new grain boundaries, and voids. For developing better predictive models of microstructural evolution during such deformation processing, it is critical to understand how all these varieties of deformation induced defects can then influence the diffusion of atoms during the processing and then ultimately dictate the microstructural evolution.

Therefore, this symposium will bring together both experimental researchers using in operando, in-situ and ex-situ characterizations including advanced microscopy and synchrotron-based X-ray methods as well as computational researchers developing new computational approaches to better predict the multiscale microstructural evolution at medium to large strains. Studies of microstructural evolution during traditional severe plastic deformation methods, friction stir processing/welding methods, cold spray, and other deformation processing methods are also of interest.

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