

Connecting the global minerals, metals, and materials community.



Plan Now to Attend:

Development of “Weak Links” during the Processing of Metallic Materials

This symposium is being held in recognition of the numerous fundamental and technological contributions that Professor Henry R. Piehler (and his students) have made in the field of deformation processing and its effect on in-service properties. Specifically, the mechanical behavior and service life of metallic components is usually controlled not by so-called “typical” microstructural features, but rather by abnormal features, which represent weak links in the material. Abnormal features may include internal cavities, un-recrystallized areas, bands of non-uniform texture/micro-texture, abnormally large grains, etc. From a statistical point of view, such problems are related to the tails of distributions and extreme values. The objective of this symposium, therefore, is to highlight current knowledge about the source of such defects from both a fundamental research perspective as well as industrial experience in the aerospace, automotive, appliance, and other industries. Topics of specific interest include, but are not limited to, the following:

- Evolution of defects associated with non-uniform/incomplete recovery, recrystallization, and/or grain growth
- Evolution of defects associated with non-uniform crystallographic texture
- Evolution of defects associated with non-uniform mechanical texture
- Evolution of defects associated with irregular macroscopic or microscopic metal flow during processing (e.g., shear bands, cavitation, micro-cracks, damage, etc.)
- Modeling of defect evolution during processing
- Quantification of the distributions of microstructural elements relevant to performance and failure
- Case histories of defect evolution at the laboratory and industrial scales
- Application of fundamental knowledge to reduce/eliminate defects in industrial processes

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