

Understanding and Controlling Nanostructure Formation and Development in NanoSteels

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Abstract

Microstructural changes occurring on the nanoscale level are often challenging and complex to understand, however once controlled, can lead to compelling properties and material performance. In this talk, the focus will be on solid state transformations which can occur in glass forming steel alloys. Two enabling routes to achieve nanoscale structures will be focused on involving either glass devitrification transformations to form devitrified nanocomposite microstructures or spinodal decomposition to form spinodal glass matrix microconstituent (SGMM) structures. The linkage of structural changes to physical properties will be highlighted with a focus on hardness, strength, and wear resistance changes related to the development of specific nanoscale structures.