MATERIALS SCIENCE AND ENGINEERING

SEMINAR

"Misorientation-Dependent Grain Boundary Migration Behavior in Fe-Si Alloys"

by

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ABSTRACT

The grain boundary migration behavior in Fe-Si transformer core alloys has been extensively studied. Contradicting results in the mobility of the special and that of the general boundaries were found. Low mobility of special boundaries and high mobility of general boundaries were observed for individual, well-characterized boundaries in the Fe-Si bicrystals. However, the reverse was observed in the bulk Fe-Si polycrystals.

The properties of polycrystalline materials are determined by their microstructures. The microstructures can be characterized by grain boundary morphology and crystallographic texture, direct consequences of grain boundary migration during the material processing. Two of the factors affecting the rate at which a particular grain boundary migrates include the misorientation of lattices on both sides of the boundary and the presence or absence of solutes or precipitates at the boundary. Understanding the grain boundary migration behavior based on these factors will be beneficial in texture engineering to achieve the desired mechanical properties for a particular material system. In Fe-Si alloys, the mechanisms by which certain grain boundaries migrate to produce the Goss texture are not well understood. This presentation will focus on misorientation-dependent grain boundary migration behavior in secondary recrystallized Fe-Si alloys.

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