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ABSTRACT TEMPLATE

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APT CHARACTERIZATION OF SOME IRON-BASED BULK METALLIC GLASSES

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Structurally amorphous metals have the potential for applications in demanding engineering components due to the inherently high elastic limit of the amorphous state. However, the toughness and fatigue resistance of these alloys must be improved before their application can be realized. It may be possible to tailor these alloy properties through precipitation of nano-crystalline particles from the supersaturated amorphous matrix to produce an optimum microstructure. To better understand the early stages of precipitation, several as-cast iron-based amorphous specimens were characterized with the Oak Ridge National Laboratory's local electrode atom probe. The local electrode atom probe has significantly increased the volume that may be analyzed with atom probe tomography (APT) and dramatically reduced the time required to acquire the data to minutes rather than days. The main focus of this atom probe tomography study was to identify quenched-in clusters and to characterize the nano-scale precipitates and any segregation profiles between the amorphous matrix and the precipitates.

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