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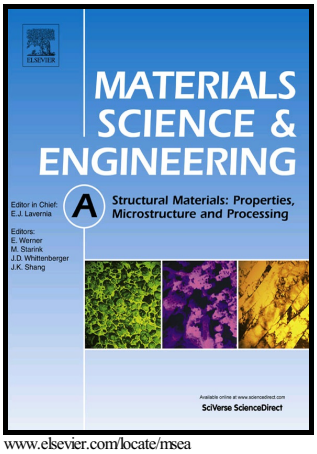

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Enhanced Coarsening Resistance of Q-phase in Aluminum alloys by the addition of Slow Diffusing Solutes

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Abstract

Here, we design thermally stable microstructures of $Al_3Cu_2Mg_9Si_7$ (Q) precipitates based on commercial aluminum alloy (AS7GU) for automotive applications utilizing low-diffusivity solutes in aluminum. We find that the newly developed alloys show a ~20 % enhancement in mechanical properties at 300°C compared to the baseline AS7GU alloy.

Keywords: Aluminum alloys; Q-phase precipitates; Coarsening; Mechanical strength; Transmission-electron microscopy (TEM); Atom-probe tomography (APT);

1. Introduction