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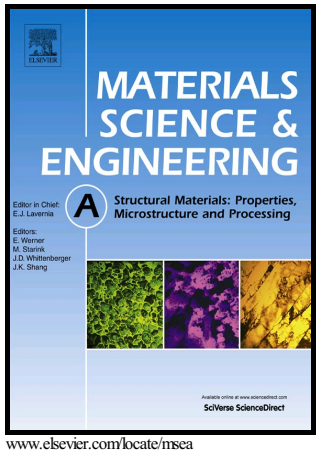

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Residual stress and yield strength evolution with annealing treatments in an age-hardenable aluminum alloy matrix composite

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Abstract

We investigated the possibility of minimizing tensile matrix residual stresses in age hardenable aluminum alloy metal matrix composites without detrimentally affect their mechanical properties (such as yield strength). Specifically, we performed thermal treatments at different temperatures and times in an age-hardenable aluminum alloy matrix composite 2014Al-15vol%Al_2O_3. Using X-ray synchrotron radiation diffraction and mechanical tests, we show that below a certain treatment temperature (250°C) it is possible to identify an appropriate thermal treatment capable of relaxing residual stress in this metal matrix composite while even increasing its yield strength, with respect to the as-processed conditions. (95)

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