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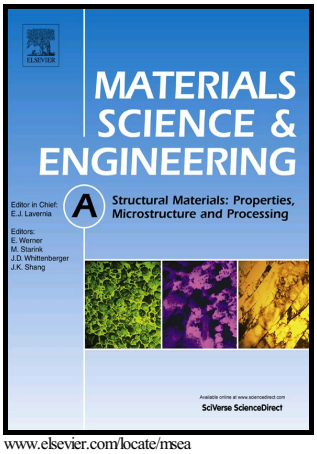

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Quantitative study of the effect of stress on the precipitation in an Al-Cu-Mg-Ag alloy single crystal

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Abstract

Al-1.96Cu-0.24Mg-0.18Ag alloy single crystal with ($\bar{2}$15) plane orientation has been used to investigate the effect of external stresses (50, 100, 134, 160 and 200 MPa) on the precipitation behavior of Ω, θ' and S precipitates. The microstructure of the aged specimens was observed by transmission electron microscopy (TEM), selected area electron diffraction (SAED) and scanning transmission electron microscopy (STEM). X-ray elemental mapping under high-angle annular dark-field (HAADF) was used to analyze the elements in the precipitates. TEM images showed that the amount and distribution of the three types of precipitates are different in specimens aged under different external stresses. Along with the SAED and STEM images, the type, amount and distribution of Ω, θ' and S precipitates were quantitatively measured. Compared