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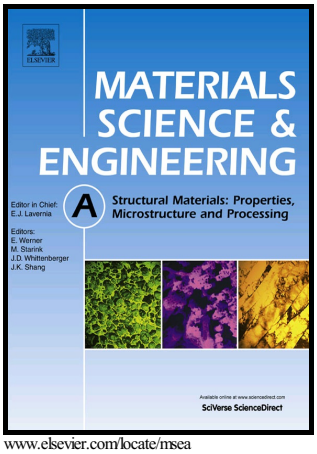

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Strengthening mechanisms in ultrafine grained Al-Mg-Si alloy processed by hydrostatic extrusion - influence of ageing temperature

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Abstract

Microstructure of hydrostatically extruded Al-Mg-Si alloy was studied by the combination of electron backscattered diffraction and transmission electron microscopy. Three different grain types which feature various defects arrangements were detected. Post deformation ageing at two temperatures caused different precipitation phenomena which were strongly dependent on type of grain boundaries in the considered grain types. Thus, a combination of plastic deformation and ageing resulted in a material with complex microstructure. Based on transmission electron microscopy observations, contributions of different strengthening mechanisms were estimated and compared to experimental results. A good agreement between obtained data points confirmed that depending on grain type, different strengthening mechanisms are operative and the overall strength is a sum of hardening given by each of