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Effect of strain amount on the behavior of intermetallicsand texture of Al-Si-Cu-Mg alloy modified with transition metals

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The uniaxial compression test was used to assess an influence of strain amount on the behavior of precipitates and texture of the Al-7%Si-1%Cu-0.5%Mg alloy, modified with micro-additions of V, Zr and Ti in as-cast and T6 heat treated conditions. As revealed through metallographic examinations, fracturing and re-orientation of the second phase particles increased with increasing compression strain. For both conditions of the alloy, the intermetallic particles experienced substantially more frequent cracking than the eutectic silicon. At the same time, the precipitates in the T6 heat treated alloy were also more resistant to rotate within the alloy matrix as a result of nano-size Al3X (X=Zr, Ti, & V) secondary precipitates. The crystallographic texture was measured and correlated with deformation behavior of the alloy. The weak texture of {011}<211> and {111}<110} components, detected after casting, transformed to nearly randomized texture due toheat treatment. An increment of room-temperature compression deformation of the as-cast, and T6 aged hardened alloy resulted in a texture consisting of a mixture of {001}<110>, {112}<110> and {111}<110> components. The intensity of the components differed depending on the strain amount and the state of precipitation where the T6 heat treated alloy always exhibited lower intensity all over the strain. It is concluded that the texture formation in studied alloy is controlled by precipitates formed during T6 heat treatment.

Biography

S K Shaha is a PhD student and Research Assistant in Ryerson University, Canada. He completed his MSc and BSc from International Islamic University Malaysia and Bangladesh University of Engineering and Technology, respectively. He has published more than 35 papers in reputed journals and conferences, and serving as a reviewer of several journals.

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