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Effects of TiB₂ particles on artificial aging response of high-Li-content TiB₂/Al-Li-Cu composite

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Abstract

The effect of TiB₂ particles on artificial aging response of cast high-Li-content TiB₂/Al-Li-Cu composite at 175 °C was investigated for the first time by a combination of various techniques, including transmission electron microscopy (TEM), scanning electron microscopy (SEM) and differential scanning calorimetry (DSC). We discovered that the nano-sized particles, in the shapes of hexagonal or equiaxed, had a strong influence on mechanical properties and microstructural evolution during artificial aging process. With the introduction of TiB₂ particles, the average grain size decreased significantly. The precipitations of θ' and T₁ precipitates were promoted in the reinforced composite, however, there was no obvious difference in the size and number density of δ' precipitates between the unreinforced alloy and reinforced composite. DSC results showed that the addition of TiB₂ did not change the precipitation sequence, although both precipitation and dissolution kinetics were altered. The reinforced composite revealed a remarkable improvement in

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