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Effects of TiB_2 particles on artificial aging response of high-Li-content TiB_2/Al-Li-Cu composite

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Abstract

The effect of TiB_2 particles on artificial aging response of cast high-Li-content TiB_2/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 equaixed, had a strong influence on mechanical properties and microstructural evolution during artificial aging process. With the introduction of TiB_2 particles, the average grain size decreased significantly. The precipitations of θ′ and T_1 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 TiB_2 did not change the precipitation sequence, although both precipitation and dissolution kinetics were altered. The reinforced composite revealed a remarkable improvement in