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Abstract

Cu is an important microalloying element in Al-Mg-Si (6xxx series) alloys, but its role in B_4C-reinforced Al-Mg-Si composites is rarely known. In this work, using the state-of-the-art Cs-corrected transmission electron microscopy (TEM), the Cu-related precipitation in a B_4C/6061 Al composite fabricated at different temperatures is revealed at an atomic level. In the composite hot-pressed at 560 ºC, Q phase is the main Cu-contained precipitates. When the pressing temperature increases to 620 ºC, the chemical reactions between B_4C reinforcements and the alloy matrix generate Al_3BC and MgB_2. Moreover, Cu is found to segregate at the interfaces between precipitates and the matrix, which is assumed to increase the nucleation of the reaction products.