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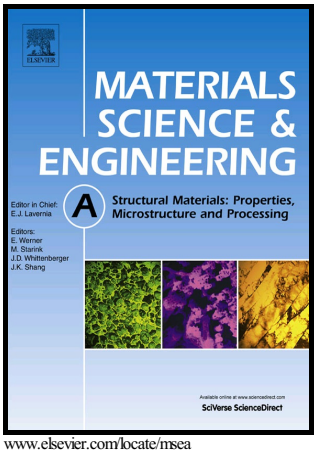

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Influence of Hot Rolling on Microstructure and Mechanical Behaviour of Al6061-ZrB_2 In-situ Metal Matrix Composites

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Abstract

Synthesis of aluminium based metal matrix composites by in-situ reaction is considered as an alternative method for production of high quality metal matrix composites. In-situ technique eliminates the limitations associated with ex-situ processing technique and it is one of the most widely accepted one. In the present work, Al6061-ZrB_2 in-situ composites have been developed by stir casting technique using commercially available Al-10%Zr and Al-3%B master alloys. Cast matrix alloy and developed in-situ composites were hot rolled at a temperature of 400^0C. Both as-cast and hot rolled matrix alloy and its in-situ composites were subjected to microstructure analysis, microhardness test, grain size studies and tensile test. Tensile behaviour of hot rolled alloy and its in-situ composites were evaluated in the rolling direction (RD), 45^0 from rolling direction (45D) and transverse direction (TD) and compared with cast ones. Optical and SEM micrographs of hot rolled in-situ composites show that the ZrB_2 particles are aligned in the rolling direction. Both as-cast and hot rolled in-situ composites have displayed extensive grain refinement and enhanced mechanical properties when compared with unreinforced alloy.