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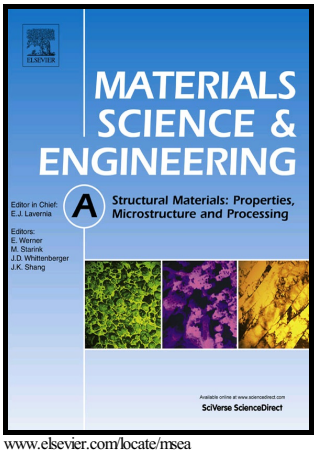

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Microstructure evolution and mechanical properties of Al-La alloys with varying La contents

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Abstract

The microstructure evolution and mechanical properties under different temperature of as-cast Al-La alloys with varying La contents were investigated by X-ray diffraction (XRD), field-emission scanning electron microscope (FESEM), energy dispersive spectrometer (EDS) and tensile test (Gleeble 3500). The results revealed that the phase compositions of Al-xLa (x=10, 15, 20) alloys were α-Al and $Al_{11}La_3$. Comparing with Al-10La, the mechanical properties of Al-15La and Al-20La were deteriorated due to the formation of strip-shaped and particle-shaped primary $Al_{11}La_3$ phase respectively. The influence of $Al_{11}La_3$ phase on tensile strength has a downward trend with the increasing temperature, and elevated temperature is more helpful to increase the plasticity of Al-La alloys with high La content. According to the tensile fracture of the three Al-La alloys at temperature range from 200^{o}C to 500^{o}C, Al-10La