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Re-crystallization of 7000 aluminum alloy with minor amounts of scandium

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Abstract

In the present study, the effect of adding trace amounts of scandium and zirconium elements to the 7075 alloy on there- crystallization behavior of one aluminium alloy (7000 series) was investigated. For this purpose, two kinds of Al-Zn- Mg-Cu-Sc-Zr alloys with the same amount of Zr and different amount of Sc were prepared. Homogenization durations and temperatures of alloys after alloying were obtained by DSC analysis and optical microstructure observations. The results showed that the optimum homogenization temperatures for Al-Zn-Mg-Cu-0.05Sc and Al-Zn-Mg-Cu-0.1Sc alloys were 500 ^{0}C and 490 ^{0}C respectively, and the optimum duration for both alloys was 12 hours. After homogenization of alloys, the re-crystallization behavior of the alloys was investigated by Brinell hardness test. Obtained results showed that although the re-crystallization temperature for both alloys was similar, but it was 130 °C for alloys with 30% forming, and 120 °C for alloys with 50% strain. The alloys peak hardness was obtained to be 146 HB

Keywords: Re-crystalyzation, Al-Zn-Mg-Cu-Sc-Zr, 7000 series aluminium