

Properties of Zn-Al Hybrid Foam using Stir Casting Technique under Compressive Deformation

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Abstract—Zn-Al alloys (Zn-27Al, Zn-12Al and Zn-8Al) hybrid foam was synthesized through stir casting technique using cenosphere particles (CPs) as thickening agent and CaH₂ (0.5 wt%) as foaming agent. Two different methods, (i) foaming of composite and (ii) direct foaming were adopted for synthesis. It was found that the properties obtained during compression test for direct foaming is better than the foaming of composite method. The cube samples of hybrid foams having relative density 0.27 were examined under compressive deformation for different strain rates (0.01, 0.1 and 1 s⁻¹) and temperature (100, 150, 200 and 250°C). The plateau stress and energy absorption capacity of hybrid foam increased with strain rate and decreased with temperature. Densification strain was almost invariant to the strain rate and temperature. The energy absorption efficiency was also calculated for the hybrid foam and it was found in the range of 63-96%.

Keywords: Zn-Al foam, stir casting, cenosphere, compression test, strain rate, temperature.