

Fabrication of Al–15Si–2.5Cu–0.5Mg (wt%) alloys via mechanical alloying and pressureless sintering

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Al–15Si–2.5Cu–0.5Mg (wt%) alloys are mostly produced by conventional casting methods alike other aluminium alloys. Al–15Si–2.5Cu–0.5Mg (wt%) alloys were synthesized via mechanical alloying for 1,2,3,4 and 8h in a SPEX™ 8000D. Particle size analyses of MA'd nano powders were measured by dynamic light scattering technique. TOPAS™ software was used to calculate the crystallite sizes and lattice strains of the powders. MA'd powders were consolidated in a hydraulic press and the bulk samples were sintered at 570C° for 2 h under Ar gas flowing conditions. Microstructural and phase characterizations of the MA'd powders and sintered samples were examined using XRD, SEM/EDS. Vickers microhardness and wear resistance measurements of the sintered samples were also measured. Relative densities of the sintered samples were measured He gas pycnometer. Results showed that hardness and wear resistance of the MA'd samples were increased with increasing milling time and relative density values were in the vicinity of 99-99.5 % for the sintered samples.

Key words: hypereutectic aluminium-silicon alloys, mechanical alloying, X-ray diffraction, scanning electron microscopy