**Studies on Mechanical Properties and Corrosion behaviour of AZ91D Surface Modified Composites Fabricated by Friction Stir Processing**

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**ABSTRACT**

The biomedical applications of magnesium alloy AZ91D are limited because of the dendritic β-Mg17Al12 phase, which degrades the mechanical properties and corrosion resistance. Friction stir processing is implemented to fabricate surface composite of AZ91D alloy with hydroxyapatite as reinforcement to improve its properties. Friction stir processing results in refinement of grains and fragmentation of the β phase with homogeneous dispersion of hydroxyapatite in the composite. The combined effect of reinforcement of hydroxyapatite and fragmentation of the β phase resulted in simultaneous improvement in mechanical and corrosion properties. The various phases, surface morphology, and composition of the developed composite are analysed using a transmission electron microscope and scanning electron microscope before and after corrosion studies. The mechanism behind the improvement in the property of the developed composite is correlated with the characterisation results.

*Keywords: Magnesium alloy, AZ91D, HAP, FSP, TEM, Corrosion*