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Tribological characteristics and Corrosion analysis of Mg-SiC composite using stir casting

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Abstract:

Automotive and aerospace applications utilize the advantage of lightweight materials such as pure magnesium owing to its low density, better strength to weight ratio and damping capacity. This investigation attempted to fabricate the two different composition of Magnesium (Mg) - Silicon Carbide (SiC) composites using stir casting method, i.e., 5% and 15% of SiC by weight in magnesium. The fabricated composites were tested to study their microstructural characterization, mechanical, tribological and corrosion resistant properties and they were compared. The better dispersion of reinforcement with the matrix material was found in the 5% SiC than with 15% SiC. However, Mg with 15% SiC produced reduced wear rate of 61.53%, 57.14% and 39.50% with a load of 15N, 30N and 50N respectively when compared with the Mg-5%SiC. The decrease in the corrosion current in polarization study and impedance spectroscopy analysis clearly exhibited the increase in the corrosion resistance of Mg-15%SiC.

Keywords: Mg-SiC Composite; Stir casting; SEM; EDAX; Wear and Corrosion

1. Introduction

The metal matrix composites are widely employed in the automobile, aerospace and defence applications because of their distinct properties such as lighter in weight, enhanced strength, stiffness, resistance to wear and corrosion [1-4]. Though magnesium has the amicable properties of light weight, better vibration and damping characteristics, it has the limitation of low elastic modulus, loss of strength with increase in temperature and poor creep resistance. Hence, magnesium is commonly reinforced with the ceramics to overcome these shortcomings. The low density and