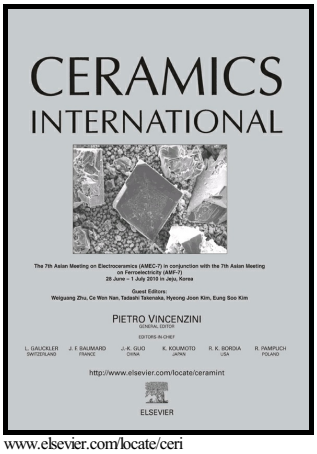

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The slurry abrasive wear behaviour and microstructural analysis of A2024-SiC-$ZrSiO_4$ metal matrix composite

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ABSTRACT

This paper mainly reports a comparative study of dual reinforcement particles with combination of numerous weight ratios of reinforcement on micro-structural topographies and slurry abrasive wear behaviour of A2024 alloy. Silicon carbide and zircon sand particles size between 37-44 µm and 20-35 µm are reinforced in the alloy respectively, by two-step stir casting method. Slurry abrasive wear study reveals enhancement for twin particle reinforcement of the abrasive wear resistance ratio (1:1) as compared to others (1:3, 3:1) weight percentage of twin particle reinforcement if mixed in a stoichiometric proportion. The wear behaviour was examined by the sample rotation technique using slurry abrasive tester. The effects of speed, slurry media and sand concentration on the slurry wear behaviour have been investigated. To observe the influence of both SiC and $ZrSiO_4$ particles dispersion matrix alloy was also characterized under similar conditions. Analysis suggests the addition of both SiC and $ZrSiO_4$ significantly improves the wear resistance of as-synthesized matrix alloy in marine industry and marine environments. However, slurry environment and speed consists to the combined effect on wear rate. The analysis also indicate the specific combination of reinforcement (12 %) with zircon sand and silicon carbide particles in the composite A exhibits better erosive wear resistance as compared to other combinations.

Keywords: A2024 alloy; Silicon carbide; Zircon sand; Slurry abrasion wear.

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