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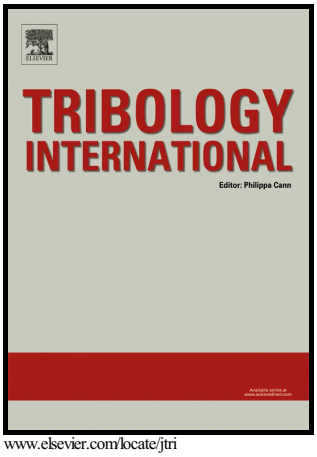

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PII: S0301-679X(16)30106-2
DOI: http://dx.doi.org/10.1016/j.triboint.2016.05.013
Reference: JTRI4194

To appear in: *Tribiology International*

Received date: 23 February 2016
Revised date: 9 May 2016
Accepted date: 11 May 2016

Cite this article as: Mohammad Moazami-Goudarzi and Farshad Akhlaghi, wea behaviour of al 5252 alloy reinforced with micrometric and nanometric SiC p a r t i c l e s , *Tribiology International* http://dx.doi.org/10.1016/j.triboint.2016.05.013

Wear Behaviour of Al 5252 Alloy Reinforced With Micrometric and Nanometric SiC Particles

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Abstract:

The dry sliding wear behaviour of Al 5252 alloy and its composites reinforced with nanometric or micrometric SiC particles is studied. The wear tests were conducted on hot extruded samples using a pin on the disc configuration under normal stresses: 0.3, 0.6 and 0.9 MPa at a sliding speed of 0.5 m/s and distance of 1000 m. The dominant wear mechanisms were determined using microstructural characterization, hardness measurement, EDS analysis as well as microscopic studies of wear surfaces and debris. The composite reinforced with micrometric SiC particles showed the lowest wear rate at the applied stresses of 0.3 and 0.6 MPa, while the nano-composites exhibited the best wear resistance at the normal stress of 0.9 MPa.

Key words: Aluminium based nano-composites; Dry sliding wear; Worn surface analysis; Wear debris

1. Introduction

Metal matrix composites (MMCs) are commonly used as materials with good tribological properties. Aluminium matrix composites (AMCs) are currently used for production of some automobile parts such as bush cylinders, crankshafts and brake discs [1, 2]. The tribological parameters that control the friction and wear performance of AMCs can be classified into mechanical-physical and material factors [3].

The most important mechanical-physical factor affecting the wear of composites is the applied load during sliding. Hosking et al. [4] showed that the wear rates of Al 2014 and Al 2024 composites reinforced with SiC and Al_2O_3 particles were increased monotonically by increasing the applied load. A number of researchers [5-10] reported the existence of a

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