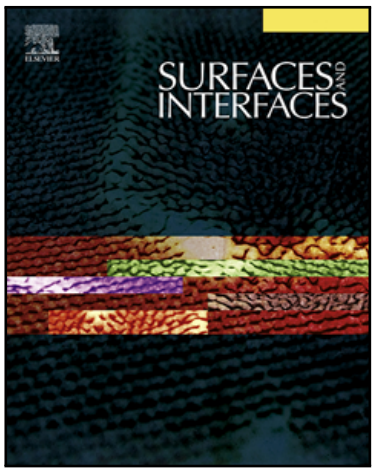

Surface characterization and specific wear rate prediction of r-GO/AZ31 composite under dry sliding wear condition

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PII: S2468-0230(17)30003-2
DOI: 10.1016/j.surfin.2017.01.004
Reference: SURFIN 59

To appear in: *Surfaces and Interfaces*

Received date: 16 November 2016
Revised date: 9 January 2017
Accepted date: 10 January 2017

Please cite this article as: V. Kavimani , K. Soorya Prakash , Titus Thankachan , Surface characterization and specific wear rate prediction of r-GO/AZ31 composite under dry sliding wear condition, *Surfaces and Interfaces* (2017), doi: 10.1016/j.surfin.2017.01.004

Surface characterization and specific wear rate prediction of r-GO/AZ31 composite under dry sliding wear condition

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Abstract:

The effect of reduced graphene oxide(r-GO) nanosheets on the dry sliding wear behaviour of AZ31 alloy composites produced by solvent based powder metallurgy technique has been investigated. The percentage of reinforcemnt addition was limited to 0.2% and 0.4%. Results show that r-GO nano-sheets considerably increases the microhardness upto 64.4 HV. The tribological behaviour of composites was investigated by pin on disc tribometer for an optimal set of control factors. Reinforcement weight percentage, load, sliding distance and sliding velocity was taken as input parameters.Taguchi coupled artificial neural network has been used to plan and analyze the experiment. Based on the study it was observed that reinforcement weight percentage and load are the most influencing factor which affects the specific wear rate. Adapted ANN results show better predictablity with R-value 99.98 % and the same was effectively used to investigate the behaviour of each control factors.

Keywords:r-GO; Metal Matrix Composite; Wear Rate; Artificial neural network (ANN)

Introduction :

Magnesium and its alloys are light weight material and have found potential application in transport industries for its drastic weight reduction of the components earlier made of Aluminium based alloy.Overview of wear performance of aluminium matrix composites reinforced with ceramic materials under the influence of controllable variables [1] But it has certain limitation like low strength, stiffness, wear resistance and stability which limits its application in wide range. Among the above said properties, wear rate is the dominate factor which reduces the life time of Mg based material and henceforth make Magnesium (Mg) alloy unsuitable for fabricating components like gears and piston[2].