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Wear behavior of Aluminium 6061 alloy reinforced with coated/uncoated multiwalled carbon nanotube and graphene

Vijee Kumar¹, Kempaiah Ujjaini Nagegowda², **Satish Babu Boppana**³, **Ramesh Sengottuvelu**³, Palanikumar Kayaroganam⁴

1. Visvesvaraya Technological University, VTU Main Road, Machhe, Belgaum, Karnataka, 590018, India

2. University Visvesvaraya College of Engineering, KR Circle, Devraj Urs Road, Bengaluru, Karnataka, 560001, India

3. School of Engineering, Presidency University, Itgalpur, Rajanakunte, Bengaluru, Karnataka, 560064, India

4. Sri Sairam Institute of Technology, Sairam College Road, Nagar, Tambavaram West, Chennai, Tamil Nadu, 600064, India

Abstract

The current study deals with the fabrication and investigation of wear characteristics of Aluminium 6061 (Al6061) hybrid metal matrix composites (MMCs) processed through powder metallurgy technique. Al6061 hybrid MMCs involving fixed 2 wt% of coated/uncoated multiwalled carbon nanotubes (MWCNTs) and varying weight percentages of graphene were fabricated through ball milling procedure. To enhance the scattering of MWCNTs in the matrix, MWCNTs were coated by means of copper through electroless deposition method. Dry sliding wear conduct of Al6061 MMCs was investigated using a pin-on-disc wear testing machine. It was found that at lower load, composites exhibited lower wear resistance than base alloy however at higher load, nanocomposites showed higher wear resistance. The research tried to find the effect of higher loads on the wear resistance. The composites were evaluated if they could give out reinforcements at higher loads during wear tests. The wear morphologies were reported using Scanning Electron Microscopy (SEM) and it was noticed that lower load abrasion was superior for the composites and base alloy although at higher loads adhesion was considered to be main reason for the wear of composites. Green ZnO NPs exhibited better antibacterial and antifungal activities, in addition to superior photocatalytic behaviour.

Keywords:

Aluminium 6061, Powder metallurgy, MWCNTs, Graphene, Wear

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