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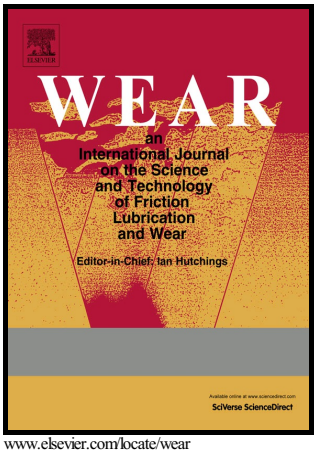

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MICROTRIBOLOGICAL BEHAVIOR OF MO AND W NANOPARTICLE/GRAPHENE COMPOSITES

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Abstract

This work examines the tribological behavior of two novel graphene composites (Mo and W nanoparticles grafted onto graphene platelets) under boundary lubrication. While similar composites have been studied in past literature, the grafted nanomaterials Mo and W have not been tested before. Such composites benefit both from the friction reduction properties of graphene and the increased load capacity provided by nanoparticles. Their application as a potential antiwear lubricant additive was investigated. Both composites were blended into a mineral base oil. Graphene and neat oil were also tested to serve as controls. By DLS characterization, these dispersions were found to be stable over the testing duration. Tribological behavior was studied using a custom microtribometer via ramped load and cyclic tests for friction and wear, respectively. Results demonstrated a similar reduction in friction with the addition of each additive while the composites provided superior antiwear properties in comparison to the base oil and graphene alone.

1. Introduction

In recent years, nanomaterials have been the subject of great interest within the lubrication community. Due to their small size, such materials are able to enter a contact and aid in friction reduction and antiwear capacities. The mechanism by which they do so varies