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Investigation of mechanical and tribological behaviors of multilayer graphene reinforced Ni_3Al matrix composites

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Abstract: Multilayer graphene (MLG) shows an attractive prospect for the demanding engineering applications. This paper reports the mechanical and tribological properties of MLG reinforced Ni_3Al matrix composites (NMCs) under dry sliding at varying sliding speed. The hardness and elastic modulus of the NMCs are significantly influenced with MLG content. It is found that the hardness and elastic modulus of the NMCs are found to be increased by increasing MLG content up to 1.0 wt.%, while decreased when MLG content is above 1.0 wt.%. Tribological experiments suggest that MLG can dramatically improve the wear resistance and decrease the friction coefficient of the NMCs. Such marked improvement of wear resistance is attributed to the reinforcing mechanisms of MLG, such as crack deflection and pull-out, and reduction of friction coefficient is related to the formation of a tribofilm on the sliding contact surface.

Keywords: A. Metal-matrix composites (MMCs); B. Wear; C. Micro-mechanics

1. Introduction

The wear resistance of metal matrix composites remains great challenge for today's

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