MAGNESIUM MATRIX COMPOSITES REINFORCED BY 2D NANOSTRUCTURED MATERIALS: PREPARATION, MICROSTRUCTURE AND MECHANICAL PROPERTIES

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ABSTRACT

Magnesium (Mg) composites become one of the important materials mentioned recently due to their potential widely used in many industries such as aerospace, defense, security etc. Conventional Mg composites reinforced with carbon fibers and particulates exhibit high specific strength and specific elastic modulus over their monolithic alloys. Recently, 2D nanostructured materials including graphene (Gr) and hexagonal boron nitride nanoplatelets (hBN) exhibited unique properties such as high aspect ratio, high strength and good thermal conductivity that have been attracted enormous interest among researchers globally as considering them as promising reinforcements for MMCs. In this work, we prepared graphene oxide (GO)/boron nitride nanoplatelets (BNNP) reinforced Mg composites having high strength, light weight and low friction coefficient for automobile and aerospace applications by using powder metallurgy method. GO/BNNP were uniform dispersed with in Mg matrix by employing the surface modification of reinforcement materials and sonication mixing technique. The obtained results demonstrated that the prepared composites exhibit the improvement in hardness, tensile strength. Additionally, the tribological properties of the composites were presented and discussed. The composites exhibited the improvement in wear resistance due to a decrease in friction coefficient and wear rate compared to pure Mg.

Key words: 2D materials, Mg composite, microstructure, mechanical properties, wear properties