Accepted Manuscript

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PII: \$1359-8368(16)31443-3

DOI: 10.1016/j.compositesb.2016.11.054

Reference: JCOMB 4747

To appear in: Composites Part B

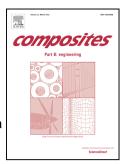
Received Date: 28 July 2016

Revised Date: 7 November 2016

Accepted Date: 22 November 2016

Please cite this article as: Wozniak J, Kostecki M, Cygan T, Buczek M, Olszyna A, Self-lubricating aluminium matrix composites reinforced with 2D crystals, *Composites Part B* (2016), doi: 10.1016/j.compositesb.2016.11.054.

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Self-lubricating aluminium matrix composites reinforced with 2D crystals

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Abstract

In this study, AA6061-base composites reinforced with graphene (Gn(12)),

hexagonal boron nitride (hBN) and molybdenum disulphide (MoS₂) particles were

analyzed. The composites were prepared by powder metallurgy processing using the

Spark Plasma Sintering to consolidate powders. Microstructure, physical and wear

properties were investigated and compared with unreinforced AA6061. For all

composites, high relative density were obtained. The tribological studies showed that

the friction coefficient significantly decreased with 2D crystals content increase. The

results indicated that abrasive mechanisms have dominated during the wearing of the

composites. Moreover, in composites with Gn(12) and MoS_2 , a film on the worn surface

was observed.

Keywords: A. Metal-matrix composites (MMCs), B. Mechanical properties, B. Wear,

E. Sintering

1. Introduction

Aluminium and its alloys are very attractive materials for various industries such

as automobile, aerospace or electronic owing to their specific strength and other

mechanical properties [1-3]. However, aluminium alloys exhibit low resistance to

abrasive wear especially under deficit lubricating conditions. To improve the

tribological properties of aluminium alloys, composites reinforced with hard ceramic

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