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Mechanical and tribological characterization of aluminium-hematite composites

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Abstract

The purpose of this study is to develop a cost effective composite that can become an alternate material for costly composites. It is planned to find out the effects of reinforcement wt. % and sintering temperature on mechanical and wear properties of aluminium-hematite composites. The composites with 0-8wt. % hematite particles were processed by powder metallurgy technique. The composites were prepared at four different compaction pressures such as 250, 300, 350 and 400MPa. The compression strength of the composites was measured using universal testing machine and their wear resistance was assessed using pin-on-disc wear test. Scanning electron microscopy was done to investigate the wear surfaces. The results showed that the composites with 8wt. % hematite developed at 400MPa compaction pressure exhibited good results. The results of the composites were further improved with the increase in the sintering temperature.

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1. Introduction

Hard particles are quite often incorporated in aluminium matrix composites to increase strength, stiffness, hardness, wear resistance and thermal stability [1-5]. The metal matrix composites (MMCs) afford good combination of wear resistance gained from hard reinforcement and toughness due to core metal matrix [6]. Metal matrix composites are engineered materials developed by the combination of two or more materials. MMCs tend to possess higher strength/density and stiffness/density ratios compared to monolithic metals.

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