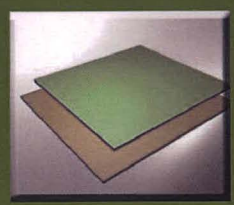
ADVANCES IN COMPOSITE MATERIALS



Iskandar Idris Yaacob
Md Abdul Maleque
Zahurin Halim

IIUM PRESS

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

ADVANCES IN COMPOSITE MATERIALS

Iskandar Idris Yaacob
Md Abdul Maleque
Zahurin Halim

IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Iskandar Idris Yaacob, Md Abdul Maleque & Zahurin Halim: Advances in Composite Materials.

ISBN: 978-967-418-231-1

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN. BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan

Table of Content

Chapter 017

Wear of Aluminium Matrix Composite – Effects of Reinforcement Combination

Md Abdul Maleque[1] and M Rezaul Karim[2]
[1]Khulliyyah of Engineering – International Islamic University Malaysia
[2]Faculty of Engineering – Multimedia University
✉ : maleque@iium.edu.my

Keywords: Aluminium matrix *composite, double particle size (DPS),* triple-particle size (TPS).

Abstract: Aluminum metal matrix composite (AMC) exhibits promising properties enhancement in the field of metal matrix composite. Improved wear properties of reinforced-AMC can be determined by varying the nature of reinforcement and their volume fraction. In this investigation, AMCs with double particle size (DPS) and triple-particle size (TPS) SiC reinforcement combination using 20 wt% SiC were developed using stir-casting process on a special oil-tempered sand mould. The result shows that wear property of aluminium matrix composite with triple-particle size SiC exhibited better results (i.e. lower wear) than double particle size SiC reinforcement as a result of proper shielding effect of base metal and the fine particles by the coarse particles. This study could be use to optimise the wear rate of structural applications developed with triple-particle size aluminium matrix composite.

Introduction

Properties of composite materials are of interest because of their excellent mechanical and wear resistance in automotive applications such as brake rotor, cylinder head, piston etc. Reinforced silicon carbide AMC is a family of composites materials whose stiffness, strength, density, and thermal and electrical properties can be tailored. The matrix alloy, the reinforcement material, the volume and shape of the reinforcement, the location of the reinforcement, and the fabrication method can all be varied to achieve required properties. Regardless of the variations, however, Al composites offer excellent thermal conductivity, high shear strength, excellent abrasion resistance, high temperature operation.

Skolianos and Kiourtsidis [1] and Lim et al. [2] have shown that aluminum alloy-based metal matrix composites (MMCs) with ceramic particulate reinforcement exhibited great promise and are seen as alternative to conventional materials. Moreover, these advanced materials have the potential performance to perform better under severe service conditions such as, higher speed and load which are increasingly being encountered in modern tribo-components. Manufacturing process plays a big role in developing the multiple-particle size SiC_p light-weight material with effective cost and environmental factors. Many researchers found that among the various MMC manufacturing processes, stir casting process is the most