

Accepted Manuscript

Vanadium carbide reinforced aluminum matrix composite prepared by conventional, microwave and spark plasma sintering

Ehsan Ghasali, Amir Hossein Pakseresht, Masoud Alizadeh, Kamyar Shirvanimoghaddam, Touradj Ebadzadeh



PII: S0925-8388(16)32096-5

DOI: [10.1016/j.jallcom.2016.07.063](https://doi.org/10.1016/j.jallcom.2016.07.063)

Reference: JALCOM 38231

To appear in: *Journal of Alloys and Compounds*

Received Date: 6 June 2016

Revised Date: 2 July 2016

Accepted Date: 5 July 2016

Please cite this article as: E. Ghasali, A.H. Pakseresht, M. Alizadeh, K. Shirvanimoghaddam, T. Ebadzadeh, Vanadium carbide reinforced aluminum matrix composite prepared by conventional, microwave and spark plasma sintering, *Journal of Alloys and Compounds* (2016), doi: 10.1016/j.jallcom.2016.07.063.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Vanadium carbide reinforced aluminum matrix composite prepared by conventional, microwave and spark plasma sintering

Ehsan Ghasali ^{a,*}, Amir Hossein Pakseresht ^a, Masoud Alizadeh ^a, Kamyar Shirvanimoghaddam ^b, Touradj Ebadzadeh ^a

^aCeramic Dept, Materials and Energy Research Center, Alborz, Iran

^b Institute for Frontier Materials, Deakin University, Waurn Ponds, Geelong, Victoria 3216, Australia

*Corresponding author: Tel : 0098 26 36280040; fax: 0098 26 36201888.

E-mail address: Ehsan_ghasali@yahoo.com

Abstract

The effect of sintering method on the structure and mechanical properties of aluminum -10 wt% VC composite was investigated. Aluminum-VC metal matrix composite was prepared successfully by conventional (at 600°C), microwave (at 600°C) and spark plasma sintering (at 450°C). The obtained results indicate that the aluminum -10 wt% VC composite prepared by SPS had the highest relative density ($99\pm 0.6\%$ TD), bending strength (295 ± 15 MPa) and microhardness (232 ± 16 Vickers). The XRD investigations showed the decomposition of VC phase and the formation of Al₃V intermetallic phase in the microwave-sintered samples. The SEM micrographs and EDS analyses revealed uniform distribution of reinforcement particles in SPS method and the formation of Al₃V phase in microwave-sintered sample.

Keyword: Aluminum, Vanadium carbide, Microwave, Spark Plasma Sintering.

1. Introduction

In the past few decades, aluminum matrix composites (AMCs) have been considered in aerospace projects, auto motive and military industries due to significant properties such as high specific strength, modulus and toughness [1-4]. Particulate reinforcements which were used in aluminum (Al) composite significantly improved the properties of AMCs due to their high hardness and strength combined with ductile aluminum matrix [5-8]. Many factors such as uniform distribution of reinforcements, thermal expansion difference, production conditions and etc. that affect the mechanical properties have been investigated by numerous researchers. But the chemical compatibility between reinforcement and matrix is the most important of above-mentioned factors [9-11]. It is worth to mention that this compatibility has a complicated influence on the final properties. Some researchers believe that the reaction between reinforcement and matrix has destructive effect on the final properties [12, 13], while others have

Download English Version:

<https://daneshyari.com/en/article/10656409>

Download Persian Version:

<https://daneshyari.com/article/10656409>

[Daneshyari.com](https://daneshyari.com)