

Accepted Manuscript

Effects of Pd ion implantation and Si addition on wettability of Al/SiC system

Zhikun Huang, Xiangzhao Zhang, Tingting Wang, Guiwu Liu, Haicheng Shao, Yiguo Wan, Guanjun Qiao



PII: S0257-8972(17)31245-8
DOI: doi:[10.1016/j.surfcoat.2017.12.027](https://doi.org/10.1016/j.surfcoat.2017.12.027)
Reference: SCT 22945
To appear in: *Surface & Coatings Technology*
Received date: 2 October 2017
Revised date: 3 December 2017
Accepted date: 10 December 2017

Please cite this article as: Zhikun Huang, Xiangzhao Zhang, Tingting Wang, Guiwu Liu, Haicheng Shao, Yiguo Wan, Guanjun Qiao, Effects of Pd ion implantation and Si addition on wettability of Al/SiC system. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Sct(2017), doi:[10.1016/j.surfcoat.2017.12.027](https://doi.org/10.1016/j.surfcoat.2017.12.027)

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.

Effects of Pd ion implantation and Si addition on wettability of Al/SiC system

Zhikun Huang^a, Xiangzhao Zhang^{a,*}, Tingting Wang^a, Guiwu Liu^{a,*}, Haicheng Shao^a, Yiguo Wan^b,
Guanjun Qiao^{a,c}

^a School of Materials Science and Engineering, Jiangsu University, Zhenjiang 212013, China;

^b Daqo Group Co., Ltd., Zhenjiang 212013, China

^c State Key Laboratory for Mechanical Behavior of Materials, Xi'an Jiaotong University, Xi'an 710049, China

E-mail: gwliu76@ujs.edu.cn

Abstract

6H-SiC (0001) monocrystal substrates were implanted with 20 keV Pd ions at three doses of 5×10^{15} , 5×10^{16} and 5×10^{17} ions/cm² at room temperature. The surface characteristics of Pd-implanted SiC substrates were analyzed by Monte Carlo simulation software SRIM-2008 and Raman spectroscopy. The effects of the Pd ion implantation into the monocrystal substrate and of the Si additions (4.8, 11.6, 19.4 and 29.2 at.%) into Al on wettability of Al/6H-SiC system were investigated using the sessile drop technique in a high vacuum at 1323 K, and the surface and interfacial behaviors were analyzed and discussed. The experimental results showed that the equilibrium contact angle of Al/SiC system increased with increasing Pd implantation dose, which can be mainly attributed to the decreasing interfacial interactions between the Al drop and the SiC substrate. However, the Si concentration had an opposite effect on the wettability of Al/SiC system when the Si concentration was higher or less than the equilibrium Si content of Al-Si/SiC system, which can be related to the variation of σ_{SL} of Al-Si/SiC system with the Si content.

Keywords: Ion implantation; SiC; Wettability; Interfaces

1. Introduction

Silicon carbide (SiC) single crystal is one of the very important third generation semiconductor materials, which has been widely applied in the high power, high

Download English Version:

<https://daneshyari.com/en/article/8024421>

Download Persian Version:

<https://daneshyari.com/article/8024421>

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