World Academy of Science, Engineering and Technology
International Journal of Materials and Metallurgical Engineering
Vol:9, No:04, 2015

Effect of Oxidation on Wetting Behavior between Silicon and Silicon Carbide

Authors : Zineb Benouahmane, Zhang Lifeng

Abstract : Experimental oxidation tests at high temperature (1300°C-1500°C) on α-SiC samples have been performed with different holding times and atmosphere (air, argon). Oxidized samples were then analyzed using X-ray photoelectron spectroscopy coupled to SEM and DAKTEK surface profiler verification. The oxidation rate and the mas gain were found to increase with temperature and holding times, corresponding to a passive oxidation regime which lead to the formation of SiO2 layer. The sessile drop method is employed in order to measure the wetting angles between Si/SiC system at high temperature (1430°C-1550°C). Contact angle can be varied between 44 °C to 85°C, by controlling the oxygen content in α-SiC. Increasing the temperature occurred the infiltration of liquid silicon and deoxidation of the coating.

Keywords : oxidation, wettability, silicon, SiC
Conference Title : ICEMA 2015 : International Conference on Engineering Materials and Applications
Conference Location : Boston, United States
Conference Dates : April 20-21, 2015