

EFFECT OF THE SINTERING ADDITIVES ON THE PROPERTIES OF SILICON NITRIDE- GRAPHENE NANOPATELETS COMPOSITES

KAŠIAROVÁ Monika, MICHÁLKOVÁ Monika, DUSZA Ján, ŠAJGALÍK Pavol

Institute of Materials Research SAS, Kosice, Slovakia, EU

Abstract

Silicon nitride based composites with 1 wt. % of graphene nanoplatelets (GNPs) were prepared using five different combination of the sintering additives. Relation between the sintering additives, evolution of the microstructure and some of the mechanical properties of Si₃N₄-GNPs composites has been studied. Observed microstructural changes depend on the viscosity of used sintering additives at sintering temperature. The incorporation of carbon-nanostructures (GNPs) into a ceramic matrix inhibits the sintering driving force leading to a lower grain size at higher temperatures and to a suppression of α transformation of silicon nitride at lower temperatures. Basic mechanical properties such as hardness, Young's modulus, fracture toughness and flexural strength of silicon nitride with the addition of 1wt.% of graphene nanoplatelets have been determined and compared to the monolithic silicon nitride.

Keywords: Silicon nitride, graphene nanoplatelets, sintering additives

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the financial support of project APVV 0161-11.

Author did not supply full text of the paper/poster.