

Elaboration by Tape Casting and Hot Lamination of Copper/Silicon Carbide Composite Thin Films for Microelectronic Applications

Jean-Francois Silvain¹, Pierre-Marie Geffroy¹, and Thierry Chartier²

¹Ceramic and Metal Matrix Composite, Institut de Chimie de la Matière Condensée de Bordeaux, France

²Laboratoire de Sciences des Procédés Céramiques et de Traitements de Surface, SPCTS-ENSCI, France

Abstract

During this last decade, the use of metal matrix composites (MMCs) materials such as Al/SiC or CuW for microelectronic devices have lead to improving the reliability of powder modules. Today, due to the continuous increasing complexity, miniaturization and high density of components in modern devices, high power microelectronic industries are looking for new adaptive thin films with high thermal conductivity, low coefficient thermal expansion, and good machinability. This paper presents an original and new elaboration method (tape casting and hot rolling) which has been optimized in order to elaborate copper/silicon carbide thin film composite materials. The first part presents the optimization of the tape casting parameters used (powder mixing; optimization of the nature and concentration of organic additives; tape casting, debinding and pre-sintering conditions). In the second part, the main characteristics of thin film obtained are discussed, such the anisotropic texture, and the electrical and thermal properties of the composite Cu/SiC thin films.