

Synthesis and Characterization of SiC from Bamboo

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Key words: Bamboo, SiC, fibers, silicon infiltration. - Bamboo is a natural composite material where cellulosic vascular fibers are dispersed in a lignin matrix. The present work investigates the transformation of these fibers into silicon carbide. Carbon preforms were prepared by heating bamboo pieces in nitrogen. Samples were soaked at 700°C for 30min to decompose the organic chains to carbon. Carbon preforms were then pyrolyzed in argon at temperatures in the range of 1200°C to 1500°C and time intervals of 5min to 240min. Pressureless infiltration of silicon in the remaining vascular fibers, and its influence on the synthesis of SiC during the pyrolysis was also investigated. Scanning and transmission electron microscopy, X-ray diffraction, X-ray fluorescence, and thermogravimetric analysis were performed to characterize the microstructure of the final materials. It was found out that cellulose was converted to fibers containing silica as a major constituent after processing. Silicon carbide was also obtained after metal infiltration.