

Characterization of Non-oxide SiC Ceramics and the Fabrication of Microfluidic Channels

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Recently, microfabrication technologies in the past two decades enabled miniaturized and large-scale integration of complex systems at affordable costs. However, the conventional fabrication processes have difficulties in fabricating the non-oxide ceramics due to low etch rate of tribological materials. Meanwhile, soft lithography has provided a valuable tool for the non-oxide ceramic microstructuring of liquid preceramic polymers at low costs.

In this study, we report on the fabrication of non-oxide SiC ceramic microfluidic channels with soft lithographic techniques. SiC ceramic was prepared by the commercial polymeric precursor, allylhydridopolycarbosilane. The nanoindentation results showed that the SiC preceramic polymer started to develop ceramic structure at 300 °C. The imprinting method was considered for microfabrication using allylhydridopolycarbosilane as a SiC preceramic polymer. In the preparation of the microchannels for the microfluidic device, it is considered that microfluidic channels and structures have the increasing potential in the field of micro total analysis system as well as in microreaction technology.