SiC inorganic 3D microstructures fabricated with Pt catalyst using stereolithography

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The precursor process for SiC ceramics, pyrolysis after solidifying liquid-state inorganic polymer, has drawn much attention since the pioneering work of Yajima. In comparison with the conventional ceramic process, this process serves more complicate and high-resolution structures. Fabrication of three-dimensional polymeric structures by two-photon initiated chemistry take advantage of the spacial selectivity of two-photon absorption(TPA). To the best of our knowledge for the first time, we have described a novel method to fabricate microstructures of inorganic preceramic polymers by two-photon 3D microfabrication method via photohydrosilylation. Pt catalyst was employed as a two-photon absorption (TPA) initiator for photohydrosilylation of commercially available inorganic preceramic polymers. The liquid precursor polymer was loaded with 1wt% of TPA initiator and was photocuried using 200mw laser power for few ms exposure time. After two-photon crosslinking process, inorganic preceramic polymers followed by high pyrolytic temperature (600°C) in a nitrogen gas atmosphere such as peroxide compounds. SiC structures. Extremely low shrinkage (4%) was observed during the experiments.