Investigation into fabrication of three-dimensional SiC ceramic nano/microstructures for high functional microdevices using two-photon crosslinking

이동훈, 임태우[1], 양동열[1], 김동표*
충남대학교; [1]KAIST
(dpkim@cnu.ac.kr*)

A novel nanofabrication process has been developed using two-photon crosslinking (TPC) for the fabrication of three-dimensional (3D) SiC ceramic microstructures applicable to high functional 3D devices, which can be used in harsh working environments requiring a high temperature, a resistance to chemical corrosion, as well as tribological properties. TPC is considered as a promising technology to pave the way for the fabrication of 3D microstructures with a sub-micron resolution. In this work, TPC is utilized to create 3D inorganic microstructures using ceramic precursors. After creation of 3D preceramic microstructures by TPC, a pyrolysis process was conducted subsequently to transform their chemical phases into ceramics. For our works, SiC ceramic precursors were synthesized; a high two-photon sensitive SiC ceramic precursor (Pt-AHPCS) was synthesized by mixituring allylhydrido polycarbosilane and (η5-cyclopentadienyl-methyl)-trimethylplatinum for a large ceramic yield of 97% at 600 ℃.