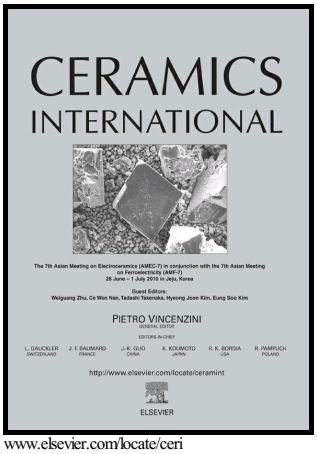

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Preparation and structural evolution of SiOC preceramic aerogel during high-temperature treatment

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Abstract

Silicon oxycarbide (SiOC) ceramic aerogels in mesopores range have been fabricated by pyrolyzing polycarbosilane aerogels in nitrogen (N_2) atmosphere. The reactants, poly(methylhydrosiloxane) and 2, 4, 6, 8-tetramethyl-2, 4, 6, 8-tetravinylcyclotetrasiloxane have been heated in the presence of hydrochloroplatinic acid. As-prepared SiOC preceramic aerogel has specific surface area of 299 m^2/g at room temperature, and decomposes during pyrolysis. Structural evolution of the aerogels as a function of heat-treatment temperature has been investigated by Fourier transform infrared spectrophotometer, X-ray diffraction analysis, transmission electron microscopy and X-ray photoelectron spectroscopy. Results indicate that tetrahedral Si–O–C network underwent four structural changes during thermal treatment from room temperature to 1600 °C.

Keywords: Aerogels; SiOC ceramics; Polymer-derived ceramic aerogels

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