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Assessment of Neutron-Irradiated 3C-SiC

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Abstract content
 (Max 300 words)

SiC is used as a containment layer in the triple-coated isotropic (TRISO) layers for the new generation of nuclear reactors. Consequently, the material is subjected to high fluences of nuclear fission particles and to high temperatures during the operation of such a nuclear reactor. The effects of irradiation on SiC have already been the subject of various investigations.

This study reports on the analysis of 3C-SiC wafers irradiated at various fluences and an irradiation temperature of 800°C. A Bruker 80 V FTIR/Raman spectrometer, fitted with a Pike 10Spec specular reflection unit was employed to obtain infrared reflectance spectra from the samples, and 32 scans were taken at a resolution of 8 cm⁻¹. The surface roughness of the various samples was measured using a CSM Instruments Nano-indenter, fitted with an atomic force microscope (AFM). Reflectance spectra were used to extract the dielectric parameters of the samples, utilizing curve-fitting procedures.

Variations in the reflectance and dielectric parameters of the irradiated samples were observed. The variations were found to be related to the fluence. In addition, variations could be linked to the surface roughness of the particular irradiated specimens. Results will be presented and discussed.

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