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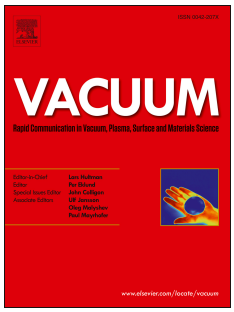

Physicochemical properties of the Sb/p-SiC interface

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Physicochemical properties of the Sb/p-SiC interface

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Abstract

A comprehensive study of the chemical composition, structural and electronic properties of antimony adsorption layers on the p–type SiC(0001) surfaces are presented in this report. All processes and measurements were performed in situ under ultrahigh vacuum conditions. Electron affinity of the cleaned substrate, determined by ultraviolet photoelectron spectroscopy (UPS), amounted to 2.8 eV. The (1×1) structure of p-SiC was revealed by low-energy electron diffraction (LEED). After adsorption of antimony, intermixing of Sb with p-SiC substrate was excluded by X-ray photoelectron spectroscopy (XPS). The work function of the Sb film showing no LEED pattern was 4.55 eV. The Schottky barrier height of the Sb/SiC interface was calculated to be 1.2 eV. After Sb desorption at the temperature above 300°C a small amount of Sb in the form of SbO_x compound remained on the surface causing a reduction in the vacuum level by 0.4 eV and increasing the electron affinity up to 3.1 eV.

Keywords

silicon carbide; antimony; Schottky barrier; metal-semiconductor junction.