SiC-based radiometers: Status, Applications, Outlook

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Siliconcarbide (SiC) offers unique properties for detecting ultraviolet radiation. A band-gap of 3.2eV allows the detection of low intensity UV radiation even in the presence of daylight and infrared radiation as its visible blindness is higher than $10^4$. In contrast to many other compound semiconductor materials, such as AlGaN, SiC has high radiation hardness against X-ray and EUV and VUV radiation. The pin device structure provides photodiodes with low dark currents (about $10^{-11}$ A/cm² at -1V bias). sgux is manufacturing SiC pin-photodiodes with a p-layer of about 200 nm thus allowing only measurements between 200 nm and 380 nm, as main market for UV detection is about measuring UV radiation from Hg vapor pressure lamps and UV LEDs in the area of water disinfection and curing. Together with the Physikalisch-Technische Bundesanstalt, sgux is developing a traceable calibration chain for irradiance responsivity of SiC-based radiometers in the spectral range range between 200 nm and 380 nm. Beyond that, the University of Sussex in Brighton, UK, successfully demonstrated single photon counting of soft X-rays using our SiC pin photodiodes [Zhao2016]. sgux is open to discuss the development of SiC-based Schottky photodiodes with improved VUV spectral response.