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 day light 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). sglux 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, sglux 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]. sglux is open to discuss the development of SiC-based Schottky photodiodes with improved VUV spectral response.

[Zhao2016] S. Zhao, T. Gohil, G. Lioliou, A.M. Barnett, Soft X-ray detection and photon counting spectroscopy with commercial 4H-SiC Schottky photodiodes, Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment, Volume 830, 2016, Pages 1-5, ISSN 0168-9002