Polarization-sensitive photoresponse of layered GeSe for self-biased photodetection

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Germanium selenide (GeSe) is a semiconducting van der Waals crystal with great potential for applications in 2D optoelectronics [1,2]. Strong anisotropy of the optical properties makes it suitable for polarization-sensitive photodetectors allowing to detect changes of the light polarization after traveling through a birefringent medium, including crystalline materials, but also biological systems, such as protein solutions [3]. Here we present an investigation of the performance of Ag/GeSe Schottky barrier photodetector. A built in potential at the metal-semiconductor interface allows separation of the electron hole pairs generated under illumination, enabling work in the self-biased mode, without external power supply. Photocurrent and optical absorption measurements revealed strong polarization dependence, fast response and high on/off ratio of the device. Photoemission characterization allowed to determine the band offsets and Fermi level position of the material, which are parameters crucial for the design of heterostructures.

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