

SIRKELI, V., NEDEOGLO, N., NEDEOGLO, D. et al. Enhanced Responsivity of ZnSe-based Metal-Semiconductor-Metal Near-Ultraviolet Photodetector via Impact Ionization. In: Physica Status Solidi (RRL) Rapid Research Letters. 2018. Vol.12, Issue 2. ISSN 1862-6254.

We report on high-responsivity, fast near-ultraviolet photodetectors based on bulk ZnSe employing a metal–semiconductor–metal structure with and without interdigital contacts. A very high responsivity of 2.42 and 4.44 A W⁻¹ at 20 V bias voltage and high rejection rate of 7900 and 4810 for the light with a wavelength of 325 nm is obtained for photodetectors without and with interdigital contacts, which indicates an internal gain. The mechanism of internal gain is attributed to the impact ionization of ZnSe atoms under high internal electric field strength of 133 kV cm⁻¹. Also a low dark current of ≈3.4 nA and high detectivity of ≈1.4 × 10¹¹ cm Hz^{1/2} W⁻¹ at a voltage of 20 V is achieved for the device with interdigital contacts at room temperature.