High detectivity $CsPbX_3$ perovskite single nanowire photodetectors

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To date, photodetectors (PDs) have been of great interest due to their potential in applications such as image sensors for smart phones, medical instruments, and autonomous vehicles and signal detectors for optical communications. The GaN, Si, and InGaAs thin-films have been used as commercial PDs for the detection of UV, visible-near infrared (NIR), and NIR-IR region and their specific detectivity (D*) are ~ 10^{12} Jones. Here, we used the single-crystalline CsPbX3 (X= Br or mixture with Cl or I) nanowires (NWs) for photo detection. The perovskite single NW-based PDs exhibited superb D* of ~ 5×10^{18} Jones, responsivity of ~ 6×10^{7} AW^{-1}, linear dynamic range of ~126 dB, high stability. Moreover, the spectral response of the $CsPbX_3$ single NW-based PDs was controllable by compositional adjustment so the perovskite single nanowire PDs show excellent performance in full visible wavelength.