

Supporting information

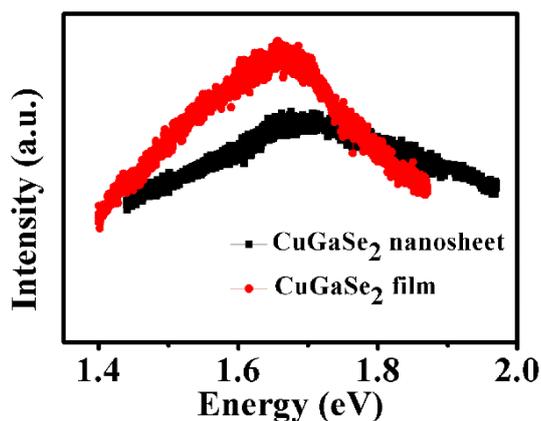


Figure S1. The PL spectrums of CuGaSe₂ nanosheets (16 nm) and films.

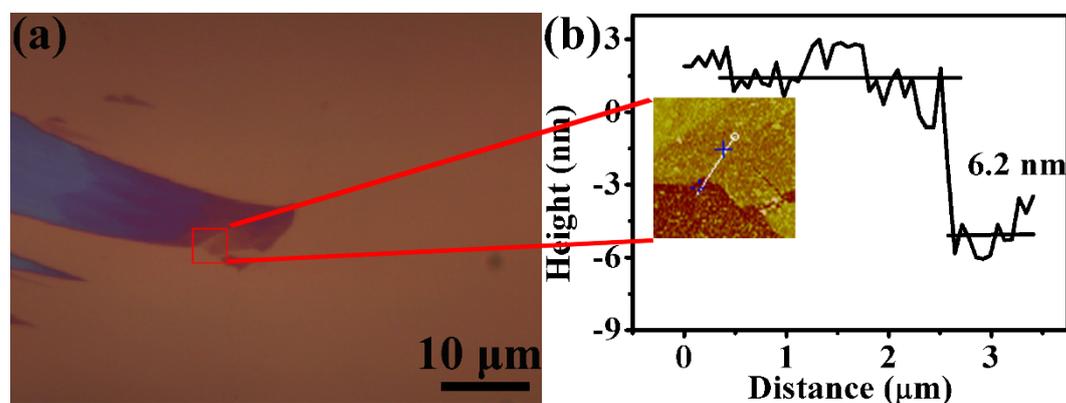


Figure S2. (a) A typical optical image of thinner CuGaSe₂ nanosheets. (b) Corresponding height profile for red square region in (a); Inset is corresponding AFM image.

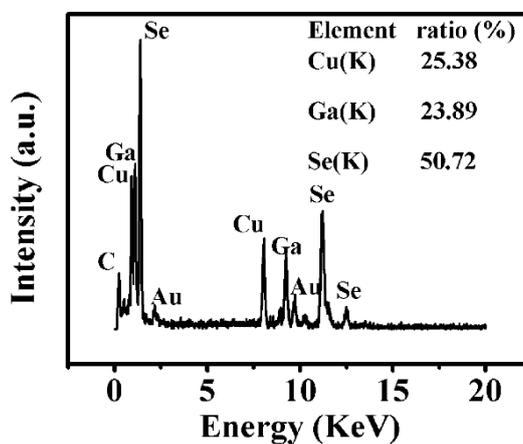


Figure S3. The EDS spectra of 2D CuGaSe₂ nanosheets.

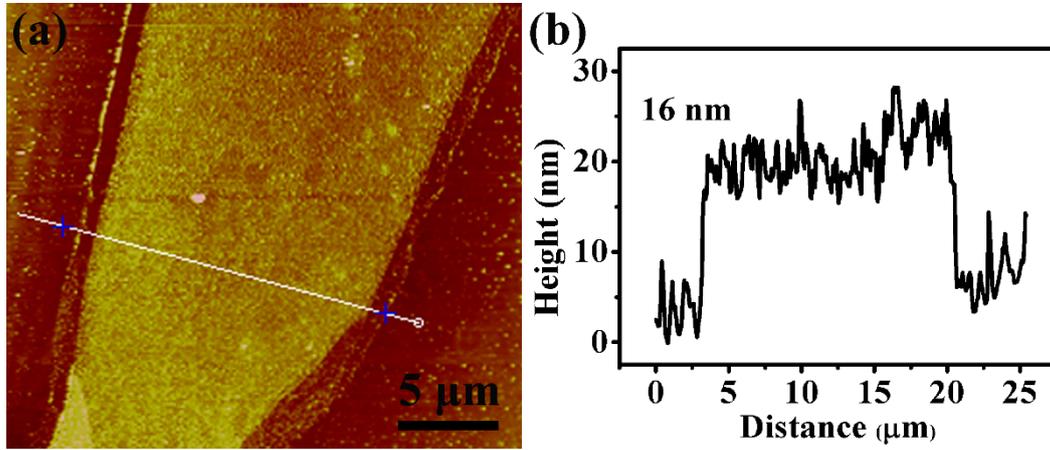


Figure S4. (a) AFM image of 2D CuGaSe₂ FETs; (b) Corresponding high profile of FETs.

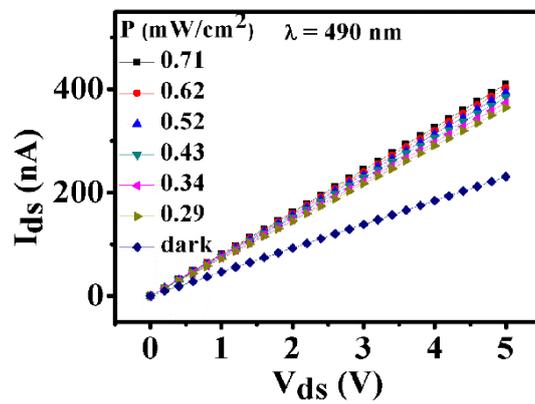


Figure S5. Output characteristics of the photodetector under illumination wavelength of 490 nm with various light intensities.

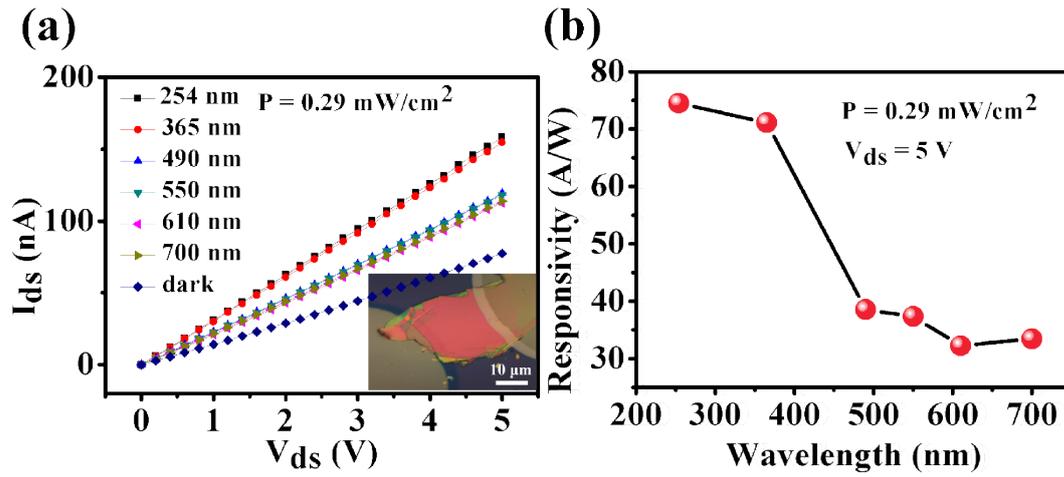


Figure S6. Optoelectronic properties characterization of CuGaSe₂ films (> 100 nm) devices. (a) I_{ds} - V_{ds} characteristics of photodetector under different illumination wavelengths for illumination intensity $P = 0.29 \text{ mW}\cdot\text{cm}^{-2}$; Inset is the optical image of CuGaSe₂ films devices. (b) Responsivity under different illumination wavelengths at bias voltage of 5 V.