Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information

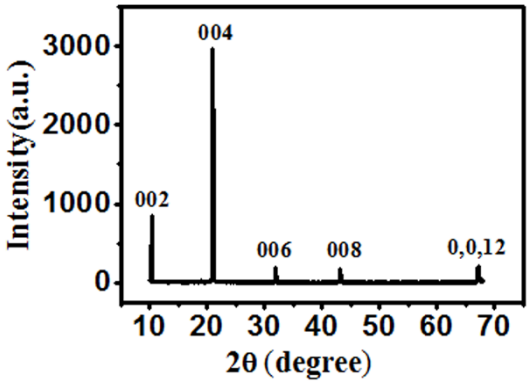

Figure S1. XRD of the as-prepared InSe crystal, showing *β*-type structure.

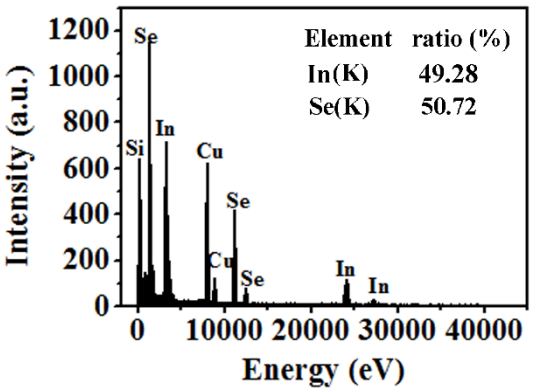

Figure S2. Chemical compositions of InSe crystals are composed of indium and Selenide with an atomic ratio of 1:1 by using EDS combined with Transmission Electron Microscope (TEM). Si and Cu peaks are from the TEM grid which is used to support InSe sample for TEM observation.

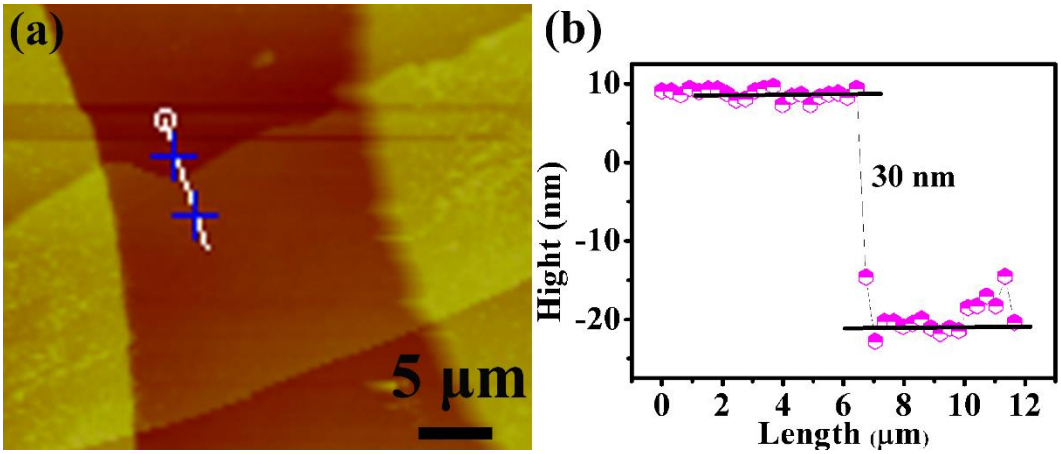

Figure S3. (a) AFM image of multilayer InSe FETs; (b) AFM height profile multilayer InSe FETs (30 nm).

Table S1. Comparison of the critical parameters for photodetectors based on 2D materials

Photodetectors	Responsivity (AW^{-1})	Detectivity (Jones)	Reference
Single layer MoS_2	880		17
Multilayer GaTe	10^4		20
Multilayer GaSe	2.8		14
Multilayer GaS	19.2	10^{13}	15
Multilayer In_2Se_3	395	10^{12}	19
Multilayer InSe	10^4	10^{13}	this work