

Supplementary Information for

Controlled growth of indium selenides by high pressure and high temperature method

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Table S1. Controlled growth of indium selenides at different growth conditions with different growth temperature and pressure.

Precursor In/Se ratio	Pressure (GPa)	Temperature (°C)	Duration (min)	Final products
2.1:3	2.0	400 (slow cooling)	300	No crystal
2.1:3	5.0	580 (slow cooling)	90	No crystal
2.1:3	5.0	630 (slow cooling)	50	No crystal
2.1:3	5.0	620 (slow cooling)	50	No crystal
2.1:3	5.0	620 (slow cooling)	60	No crystal
2.1:3	5.0	620 (slow cooling)	420	No crystal
2.1:3	7.5	610 (slow cooling)	300	No crystal
2.5:3	2.0	560 (quench)	120	No crystal
2.5:3	2.0	600 (quench)	180	No crystal
2.5:3	7.5	500 (quench)	90	No crystal

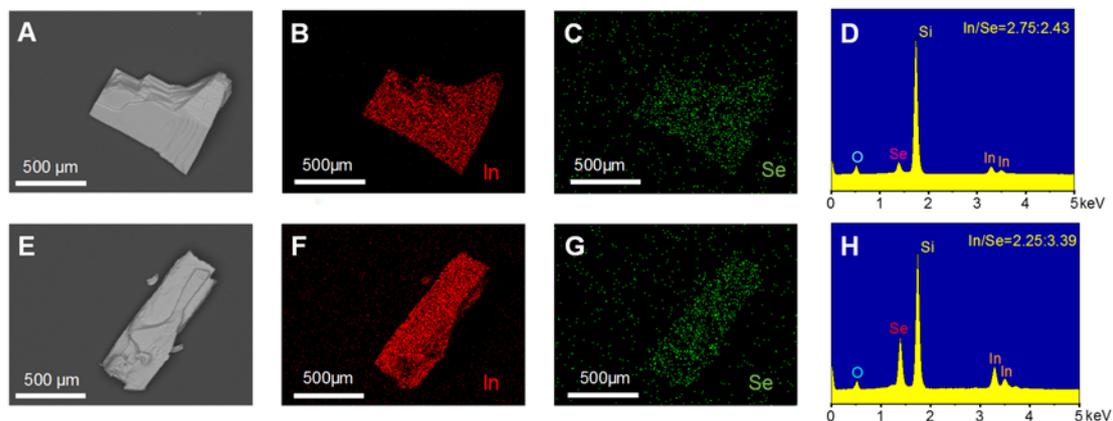


Figure S1. The energy dispersive X-ray mapping spectroscopy of indium selenides. (a) SEM image of γ -InSe flake. (b-d) The elemental mapping images scanned on γ -InSe flake in (a). (e) SEM image of α -In₂Se₃ flake. (f-h) The elemental mapping images scanned on α -In₂Se₃ flake in (e).

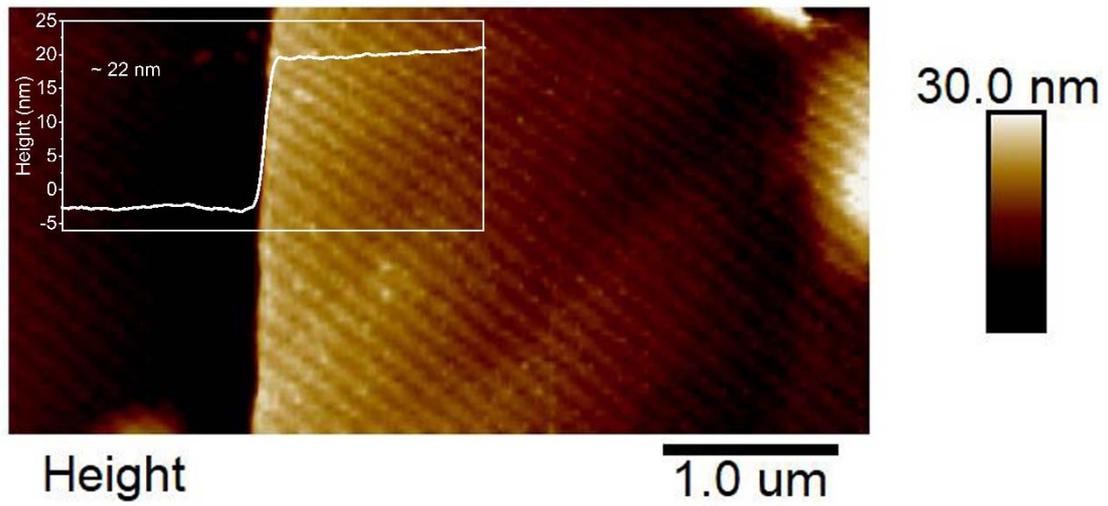


Figure S2. AFM measurement of γ -InSe thin flake. The height profile is shown in the inset, indicating the thickness of γ -InSe thin flake is about 22 nm.

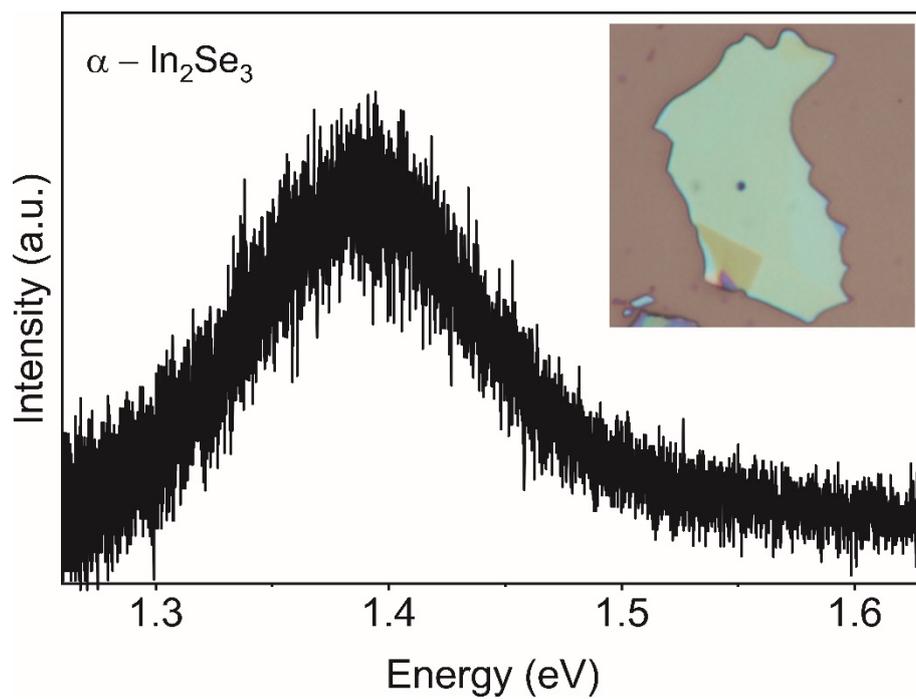


Figure S3. Photoluminescence (PL) spectra of exfoliated α - In_2Se_3 flake on SiO_2 substrate. Inset shows the optical image of the α - In_2Se_3 flake used for PL measurement.