Supplementary Material

Wurtzite materials in alloys of rocksalt compounds

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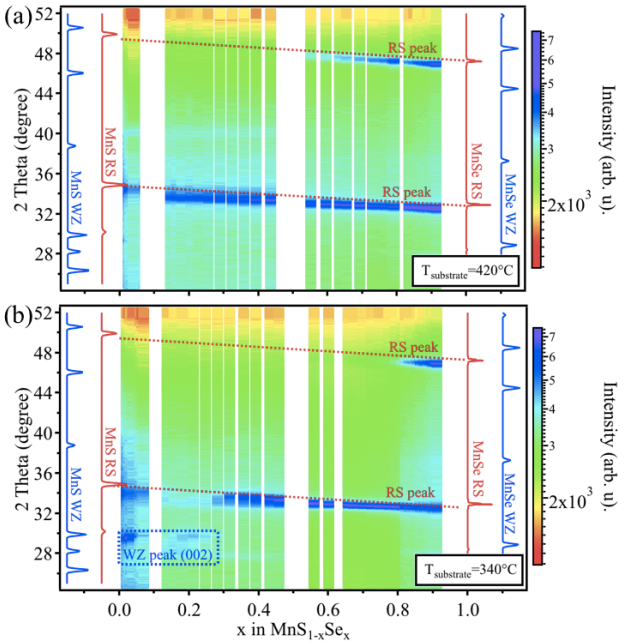

Figure S1. XRD maps of $MnS_{1-x}Se_x$ alloys as a function of x at (a) 420 °C and (b) 340 °C. Compared to alloys at the lower temperature 280 °C in the main text, the alloys show Rocksalt (RS) crystal structure in the whole composition at both higher temperatures here, with Wurtzite (WZ) phase appears from x=0.3 at 340 °C.

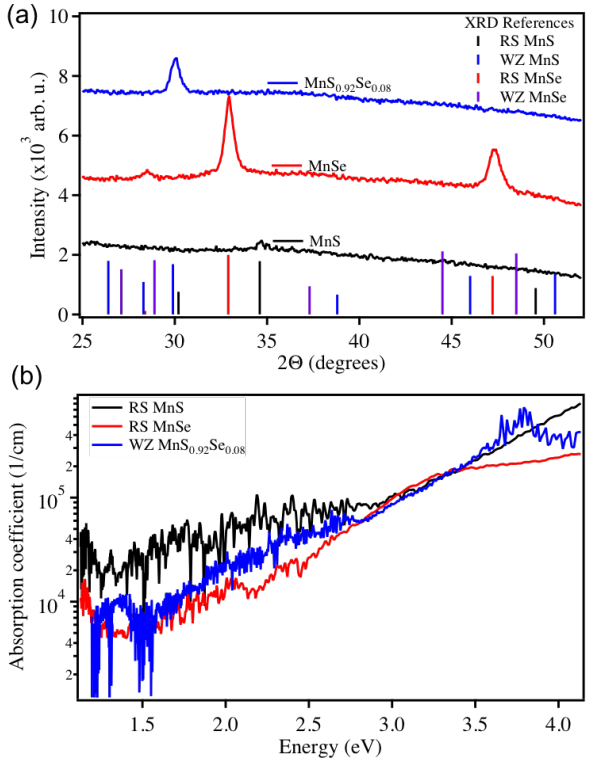

Figure S2 (a) XRD patterns and (b) optical absorption spectra of $MnS_{1-x}Se_x$ thin films deposited at 280C.

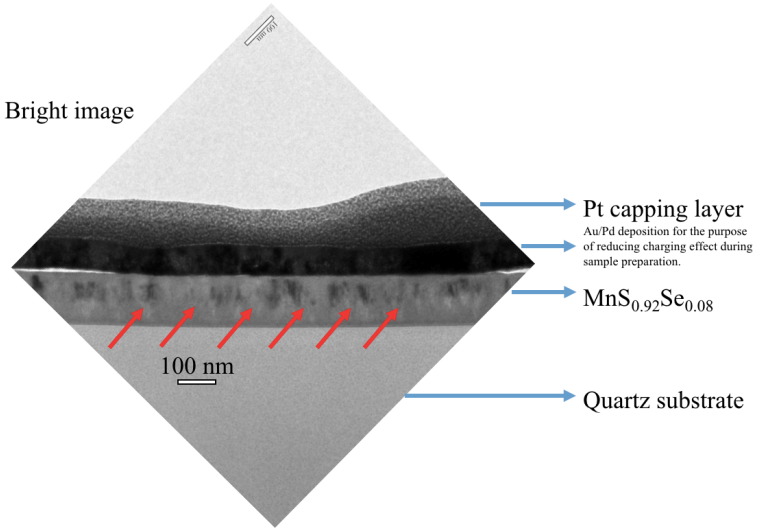

Figure S3 TEM sectional image of $MnS_{0.92}Se_{0.08}$ grown at 280 °C.

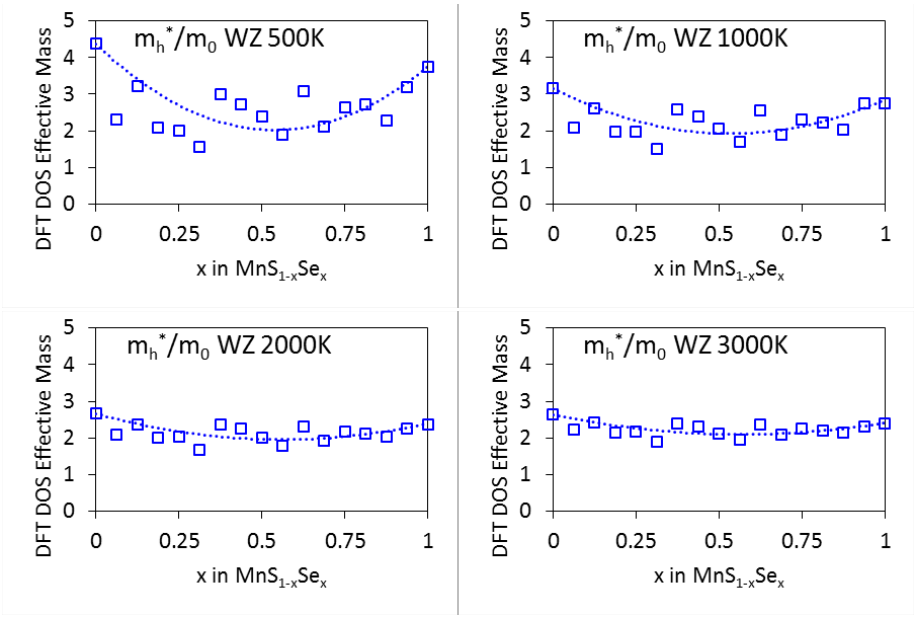

Figure S4 Density of states effective mass calculations for valence band in WZ polymorph of $MnS_{1-x}Se_x$ alloys at different energy integration interval, corresponding to effective temperatures in the 500-3000K range.