Electronic Supplementary Material (ESI) for CrystEngComm.

Electronic Supplementary Information

Growth of MSe semiconductor nanowires on metal substrates through an Ag_2Se-catalyzed solution-solid-solid mechanism (M = Zn, Cd and Mn)

Huimin Wang, Tingting Wang,* Zibin Huang, Yizhuo Liu, Dehui Leng, Junli Wang*

School of Materials Science & Engineering, Jiangsu University, Zhenjiang 212013, P. R. China

*E-mail: wangjl@ujs.edu.cn; wang_tt@ujs.edu.cn

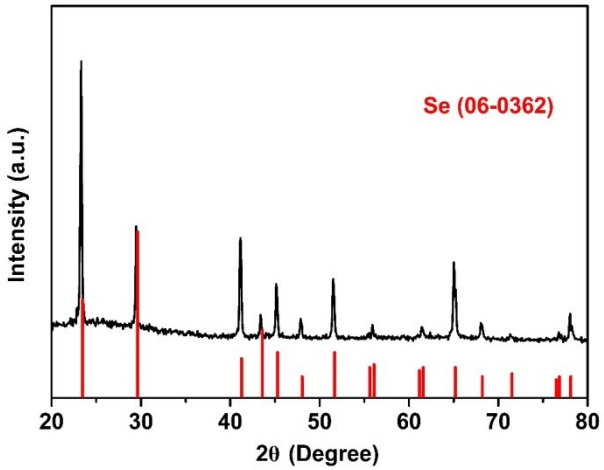

Fig. S1 XRD pattern of the Se intermediate generated from the reduction of SeO_2 in a control experiment.

Details for the control experiment.

The control experiment was conducted without adding metal precursors. Briefly, polyvinyl pyrrolidone (PVP, 0.200 g, M_w = 24000, K23–27) and SeO_2 (1.0 mmol, 0.11 g) were respectively dissolved into DMF (10 mL) in a 50 mL three-necked flask under magnetic stirring. Then, 5 mL oleic acid (OA, 99%) was added into the above solution, and the flask was heated to 160 °C. It was observed that the color of solution changes from colorless, red-brown, to black, which indicated the formation of elemental Se. After naturally cooled to room temperature, the black precipitate was collected by centrifugation, washed with ethanol, and finally dried at 60 °C for the powder XRD analysis.

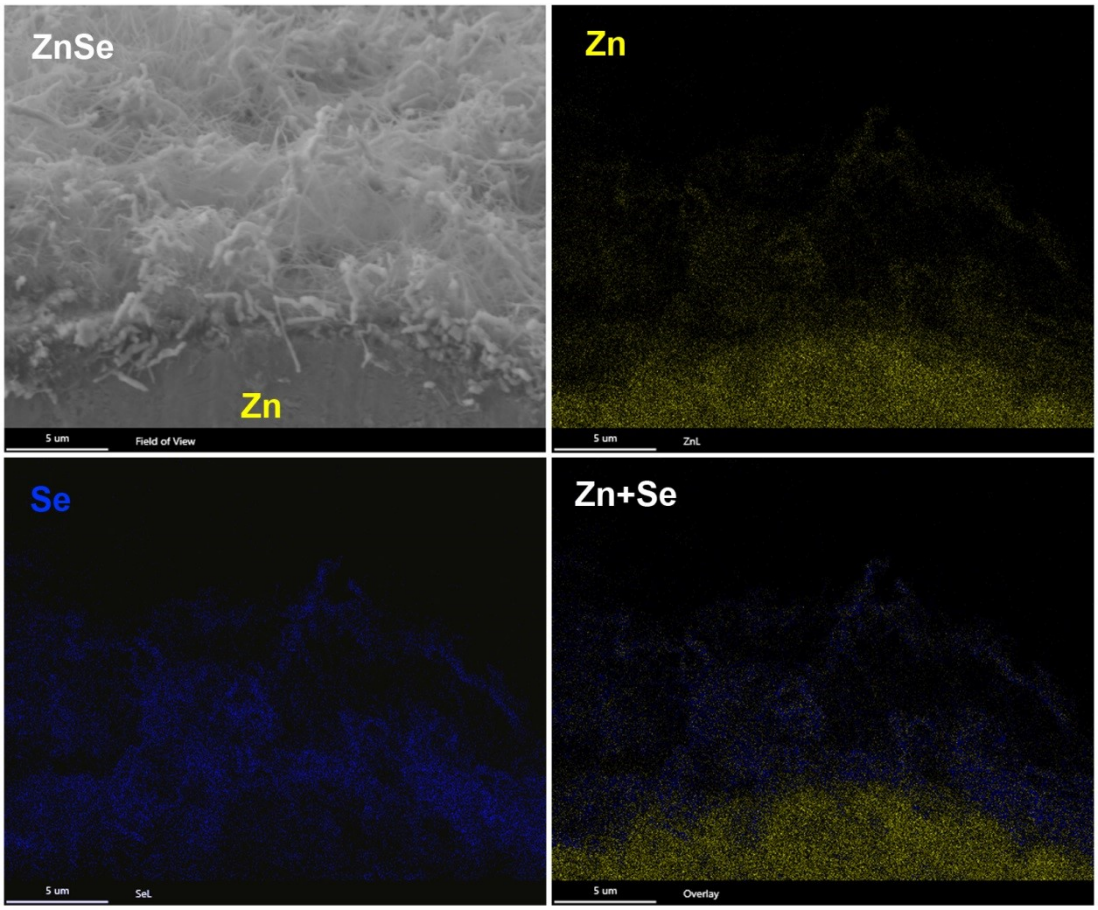

Fig. S2 SEM and EDS mapping images of the ZnSe/Zn NWs/metal sample. It is observed that Zn and Se elements are distributed in the region of ZnSe NWs. Zn shows a very strong signal at the bottom of the Zn substrate region, indicating the substrate is composed of pure metallic Zn.

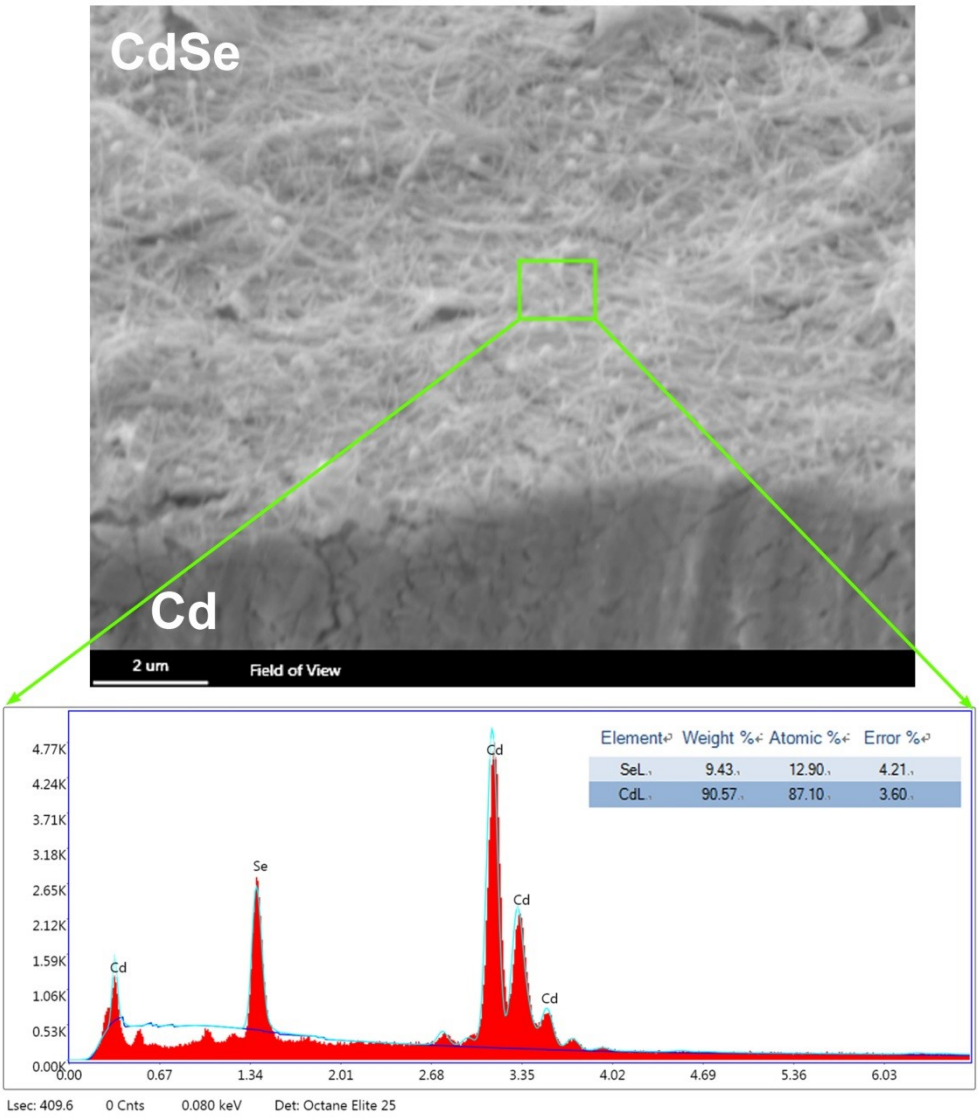

Fig. S3 SEM image and EDS point-analysis spectrum of the CdSe/Cd NWs/metal sample. It is observed that the NWs are composed of Cd and Se elements. The high molar ratio of Cd is due to the metallic Cd substrate.

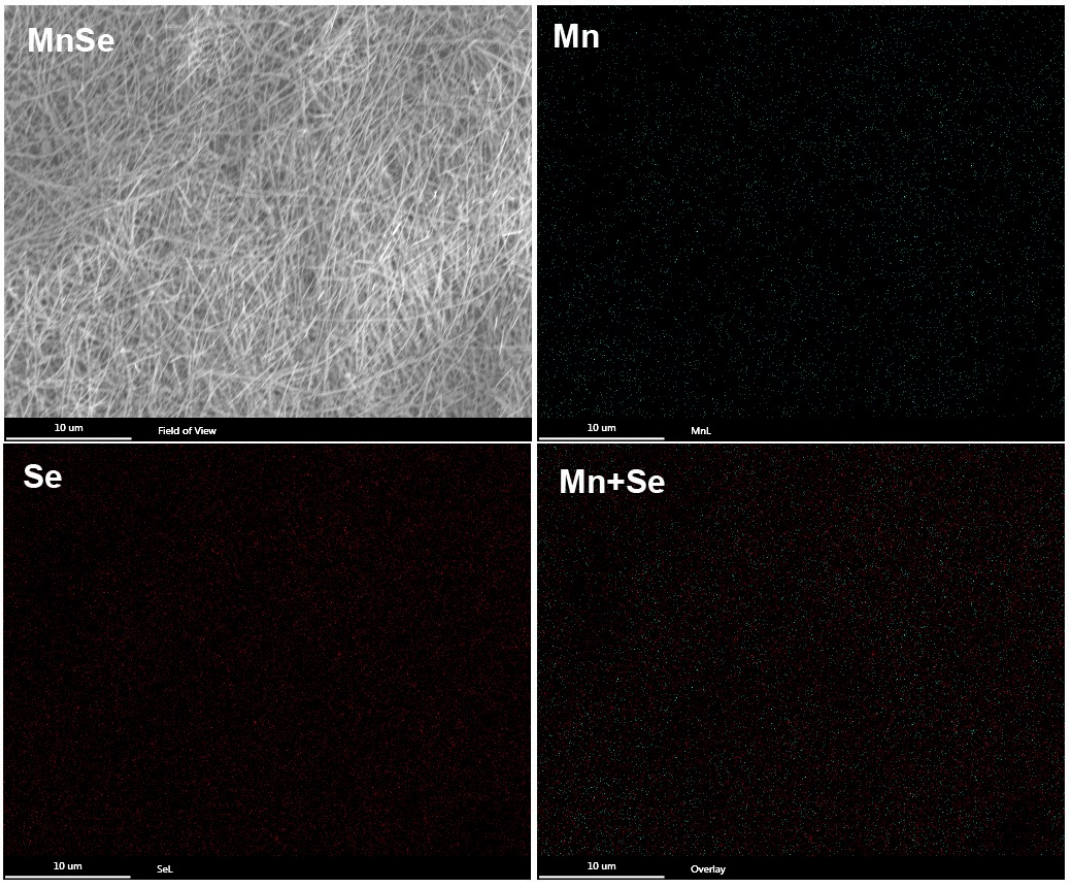

Fig. S4 SEM and EDS mapping images of the MnSe/Mn NWs/metal sample. It is observed that Mn and Se elements are uniformly distributed in the region of MnSe NWs.

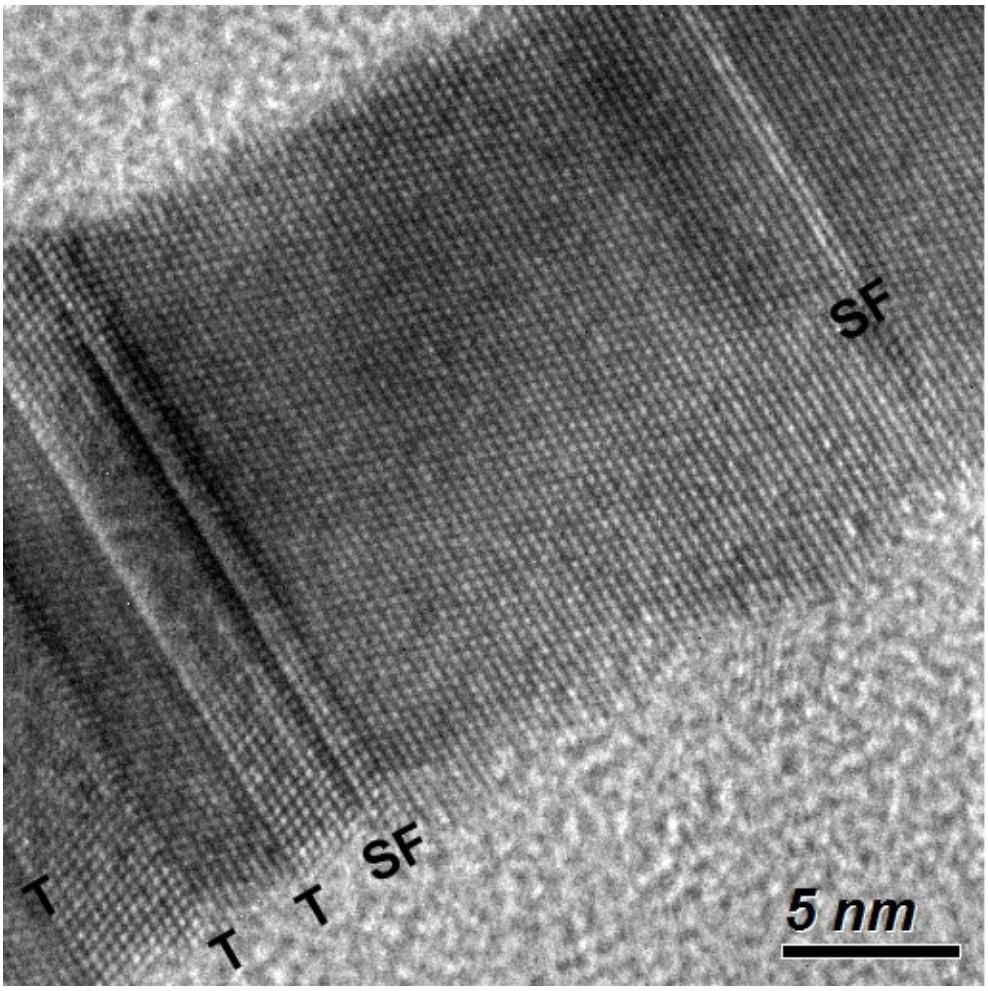

Fig. S5 HRTEM image of a zb-structured ZnSe NW containing stacking faults (SF) and twin (T) boundaries.

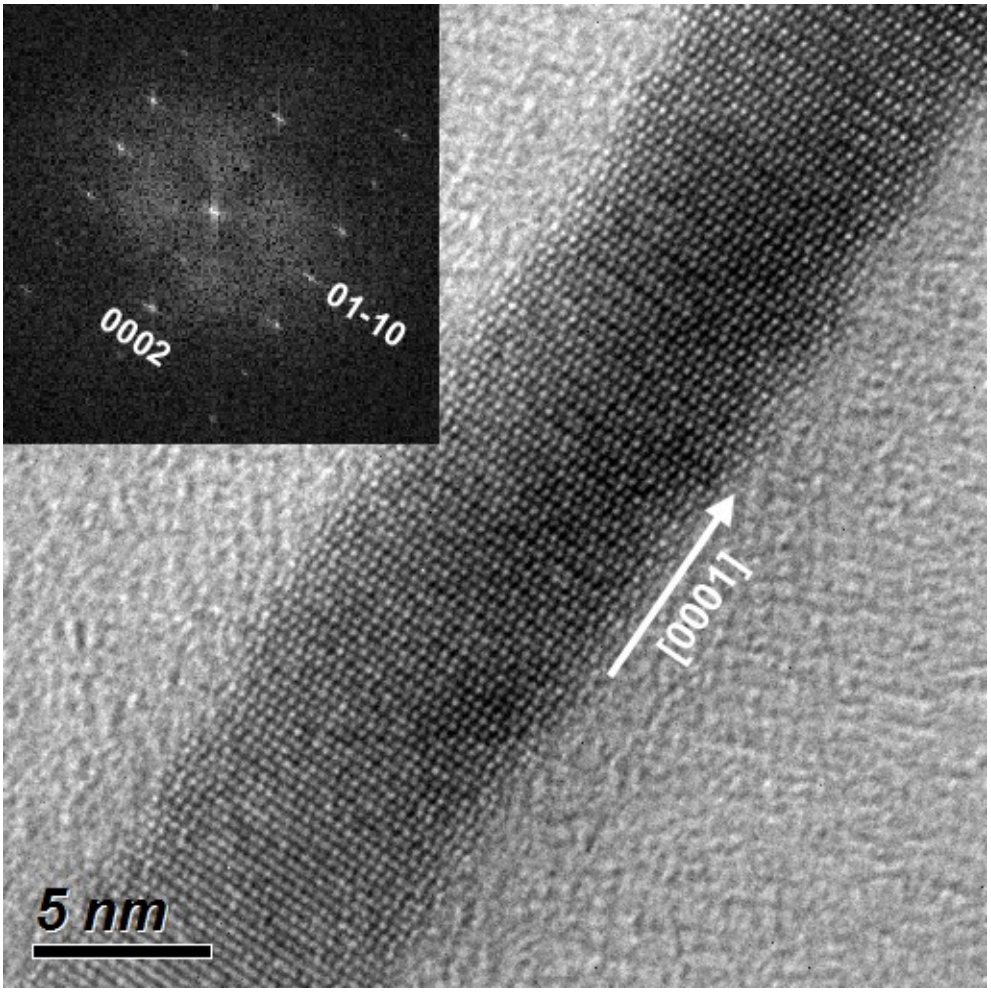

Fig. S6 HRTEM image of another wz-structured MnSe NW with a [0001] growth direction.