Supporting information

Solution synthesis of conveyor-like MnSe nanostructured architectures with an unusual core/shell magnetic structure

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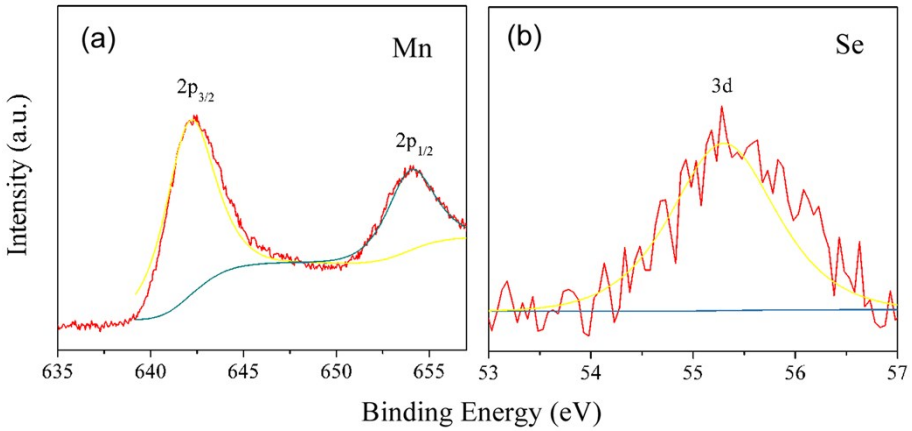

Fig. S1 The typical XPS analysis of the as-prepared WZ-MnSe nanoconveyors, (a) Mn 2p region, and (b) Se 3d region. The two distinct peaks of 642.2 and 653.9 eV are assigned to Mn $2p_{3/2}$ and Mn $2p_{1/2}$ core level, respectively, which can be used as a fingerprint to identify the presence of Mn(II), and the fitting peaks centered at 55.3 eV is consistent with Se 3d core level.[S1]

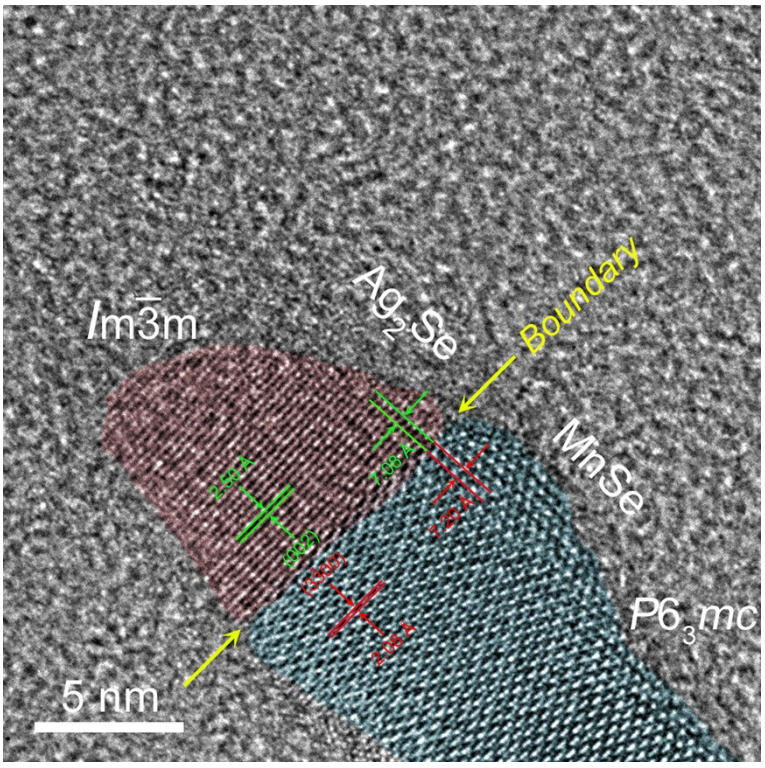

Fig. S2 HRTEM image of the endpoint in a NW. The two yellow arrowheads indicate the boundary between Ag_2Se and MnSe. The Ag_2Se nanoparticles can be indexed to the cubic phase with the space group of *I*m3m (a = 4.99 Å), and the MnSe NW has a WZ-type structure with the space group of $P6_3mc$ (a = 4.16 Å, c = 6.70 Å). Along the interfaces, the mismatch value between MnSe $(1\bar{1}00)[11\bar{2}0]$ and Ag_2Se (002)[110] is ~1.7 %, the mismatch of MnSe $(1\bar{1}00)[0001]$ and Ag_2Se (002)[110] is ~5.5 %, and the mismatch for MnSe $(0002)[3\bar{3}00]$ and Ag_2Se (002)[110] is ~16 %, as calculated using the standard cell parameters.

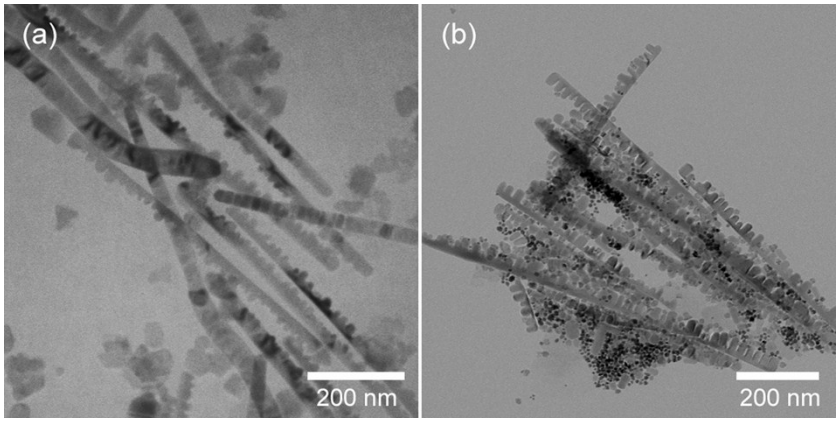

Fig. S3 TEM images of the sample obtained at different amount of Ag nanoparticle solution: (a) 0.05 mL, and (b) 0.2 mL.

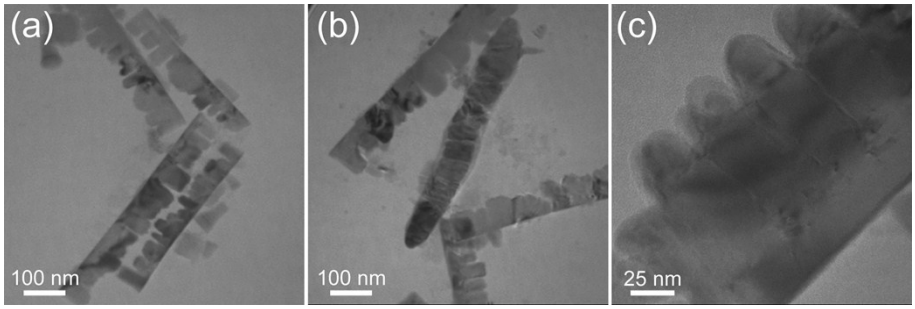

Fig. S4 (a, b) low-, (c) high-magnification TEM images of the synthesized MnSe nanosaws with thick teeth.

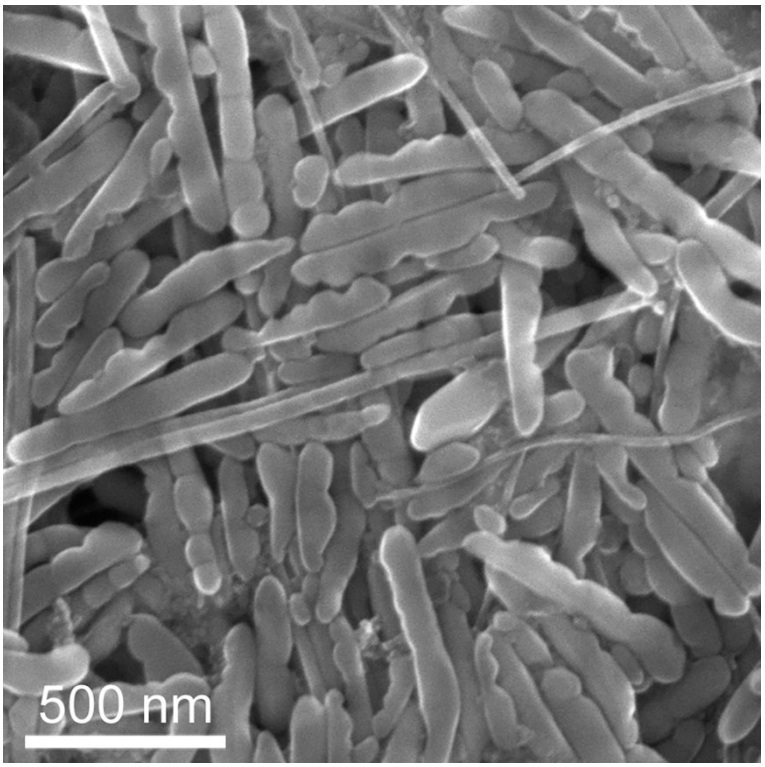

Fig. S5 SEM images of the synthesized MnSe nanopods.

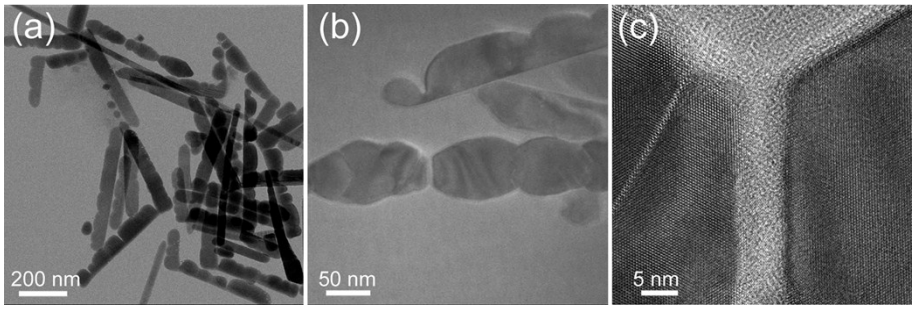

Fig. S6 (a) low-, (b) high-magnification TEM images, (c) HRTEM image of the synthesized MnSe nanocondyles.

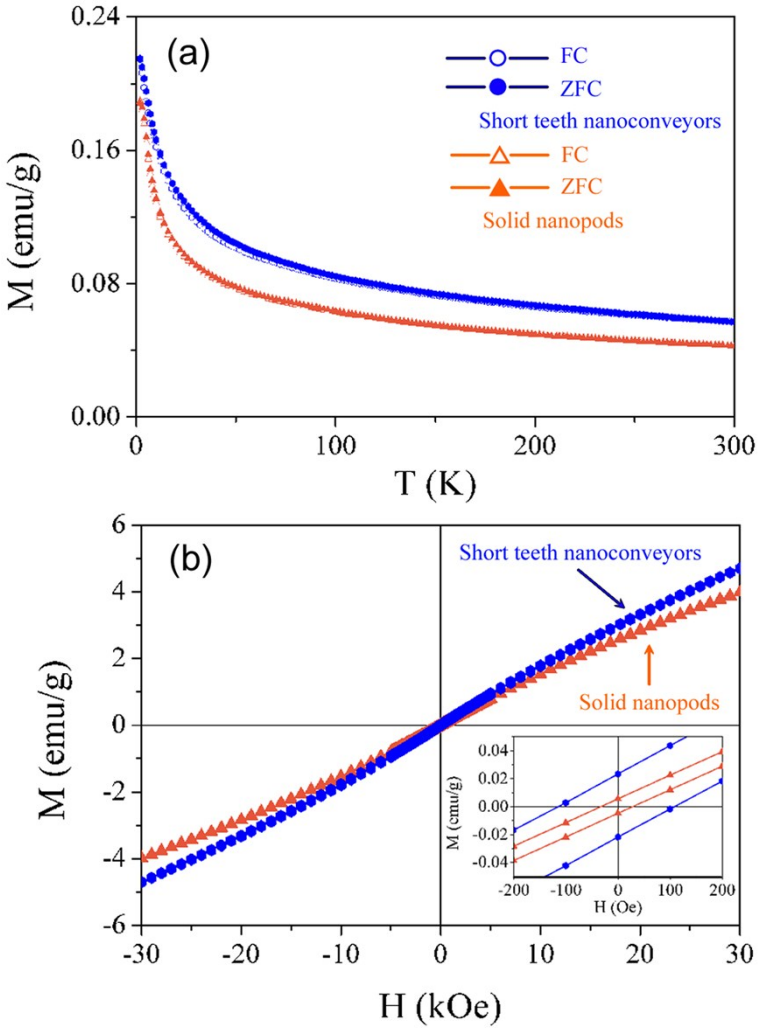

Fig. S7 (a) Temperature dependence of FC and ZFC susceptibility, (b) hysteresis loops at 5 K for the short teeth nanoconveyors obtained at 300 °C, 3 min and solid nanopods.

[S1] T. Qin, J. Lu, S. Wei, P. Qi, Y. Peng, Z. Yang, Y. Qian, *Inorg. Chem. Commun.*, 2002, **5**, 369–371.