## Electronic Supplementary Information (ESI)

# Hybrid A-B-A Type Nanowires through Cation Exchange

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**Supporting information 1**

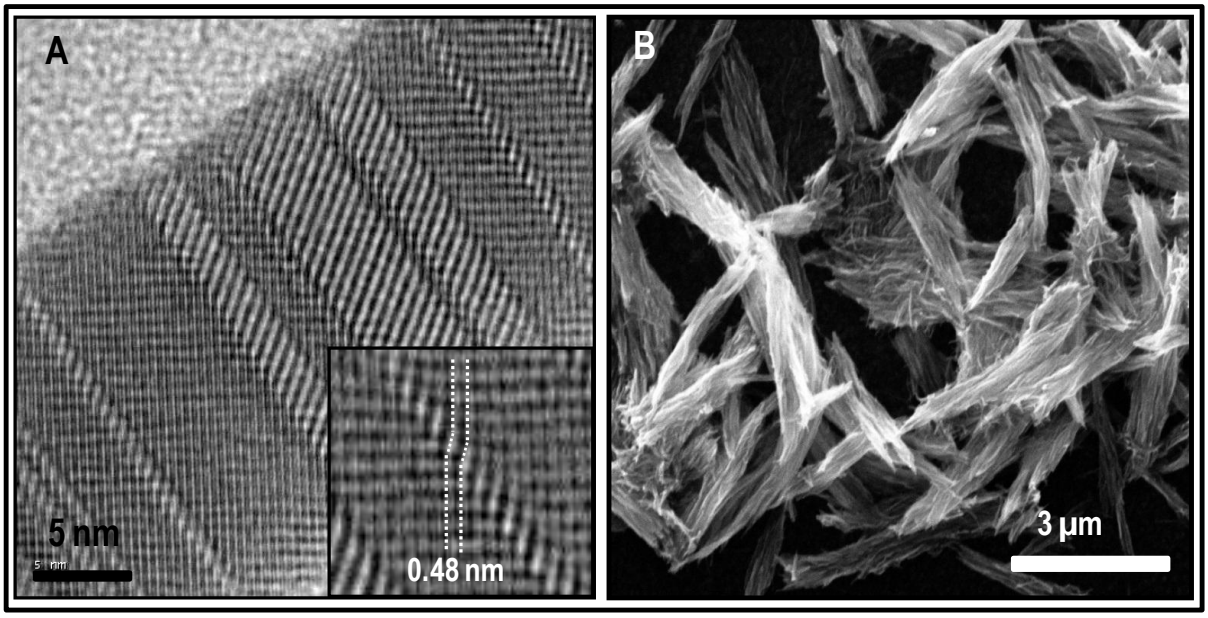


**Fig. S1** (A) HRTEM, and (B) large area SEM image of $Hg^{2+}$-reacted $Ag_2Te$ NWs. Inset of A (stacking fault is marked) shows an expanded view of the stacking faults.

**Supporting information 2**

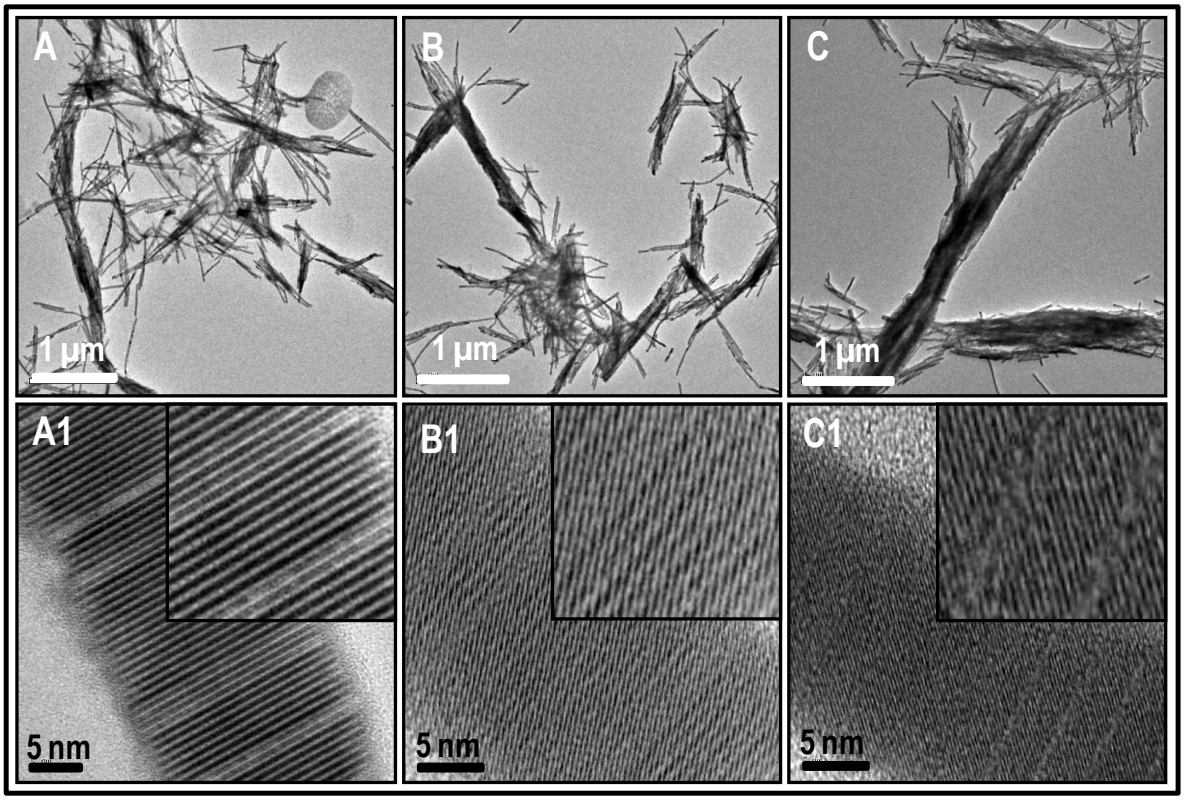


**Fig. S2** Large area TEM and HRTEM images of $Ag_2Te$ NWs reacted $Pb^{2+}$ (A) and (A1), $Cd^{2+}$ (B) and (B1), and $Zn^{2+}$ (C) and (C1). Insets show the expanded views of the respective images. No stacking faults are seen.

**Supporting information 3**

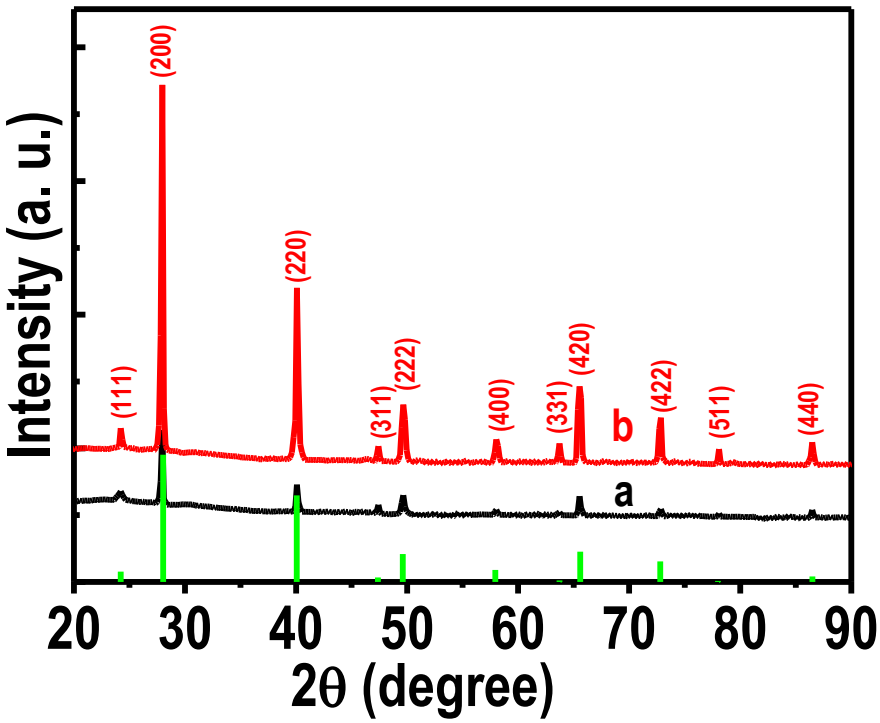


**Fig. S3** XRD patterns of $Hg^{2+}$-reacted $Ag_2Te$ NWs at different concentrations, (a) 100 and (b) 1000 ppm. Standard peaks of HgTe (JCPDS: 75-2084) is given as stick spectrum.

**Supporting information 4**

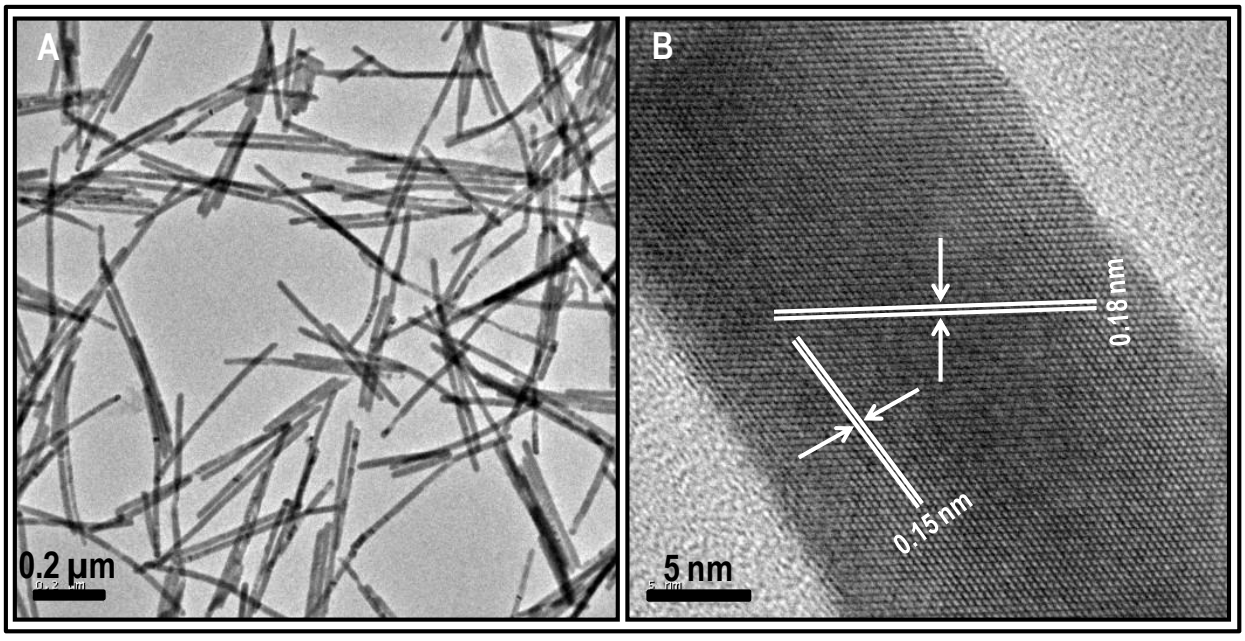


**Fig. S4** (A) Large area TEM, and (B) HRTEM image of the body of a single NW of $Hg^{2+}$ (1000 ppm) reacted $Ag_2Te$ NWs.

**Supporting information 5**

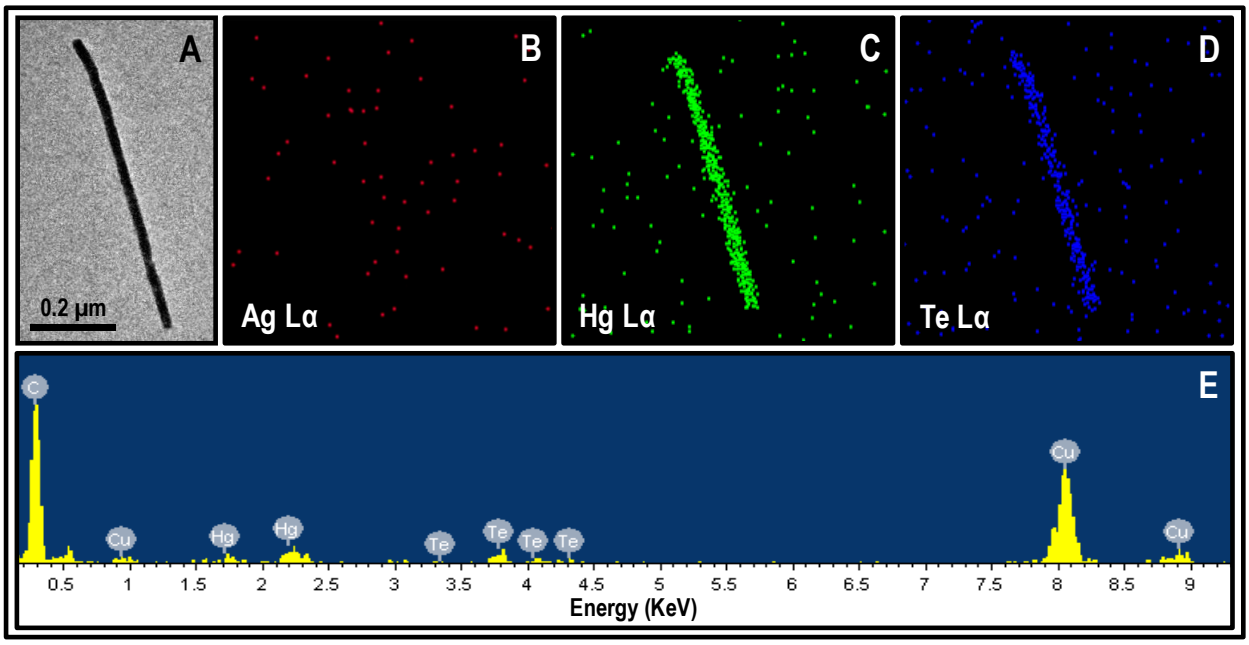


**Fig. S5** TEM image used for the elemental mapping (A), elemental mapping of Ag (B), Hg (C) and Te (D), and EDAX spectrum (E) of $Hg^{2+}$ (1000 ppm) reacted $Ag_2Te$ NWs. Cu is from the substrate used for the measurement.

**Supporting information 6**

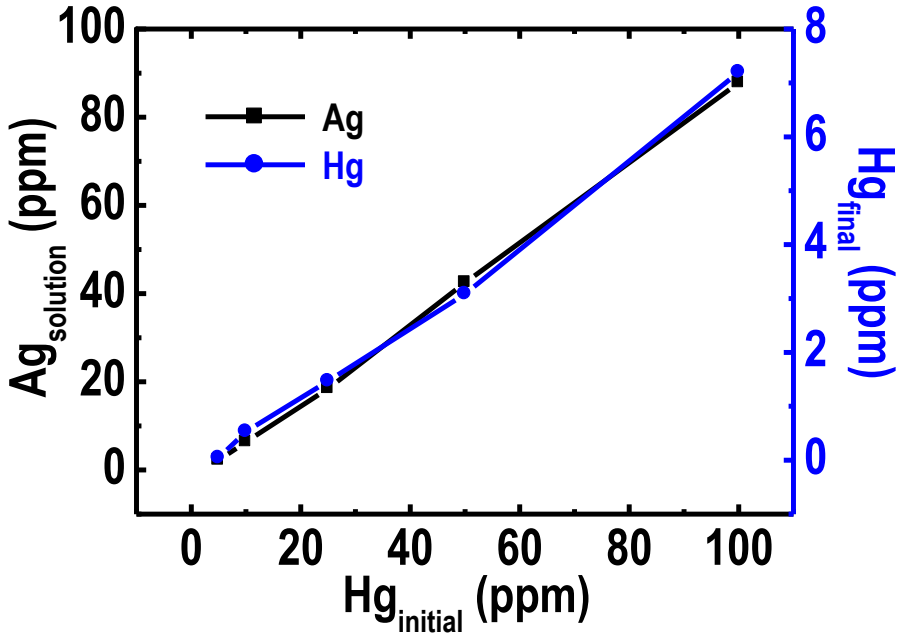


**Fig. S6** The plot shows the concentrations of $Ag^{+}$ and $Hg^{2+}$ in the supernatant against $Hg^{2+}$ used.

**Supporting information 7**

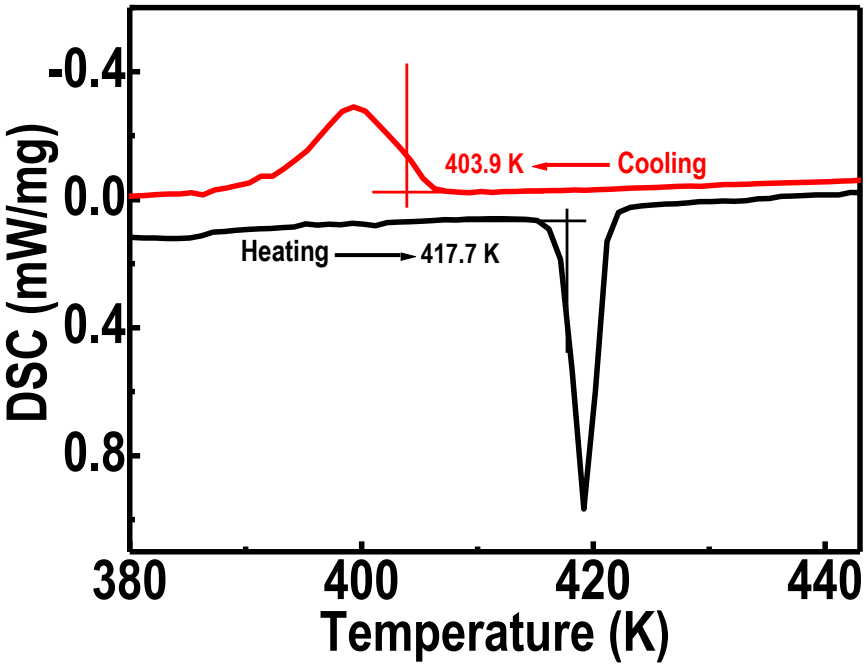


**Fig. S7** DSC traces of $Ag_2Te$ NWs.

**Supporting information 8**

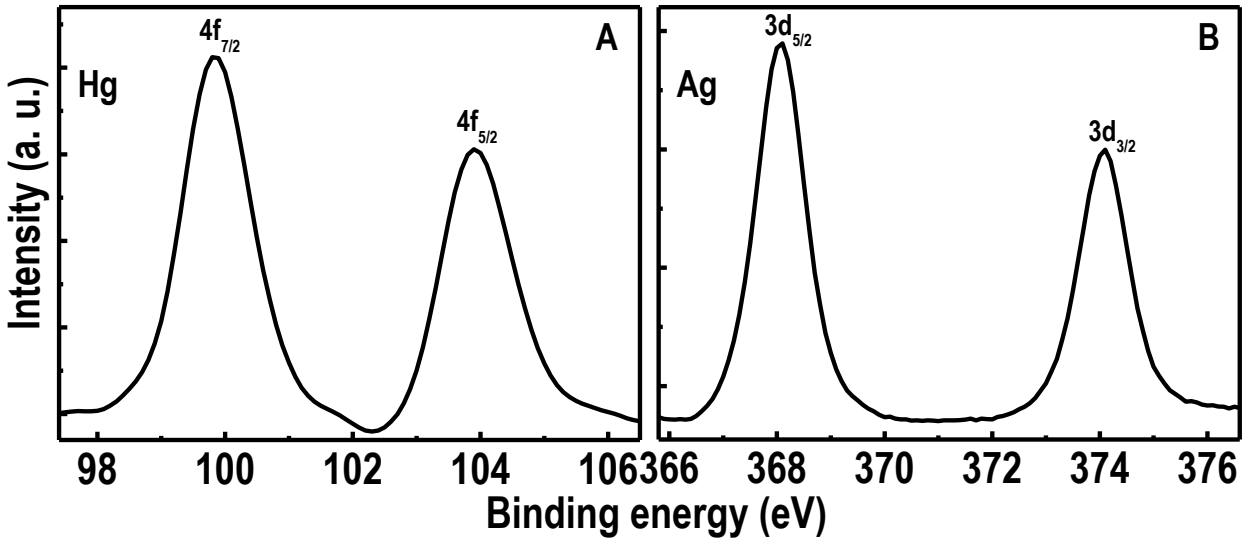


**Fig. S8** Expanded XPS spectra in the Hg 4f (A) and Ag 3d (B) regions of $Hg^{2+}$-reacted $Ag_2Te$ NWs.

**Supporting information 9**

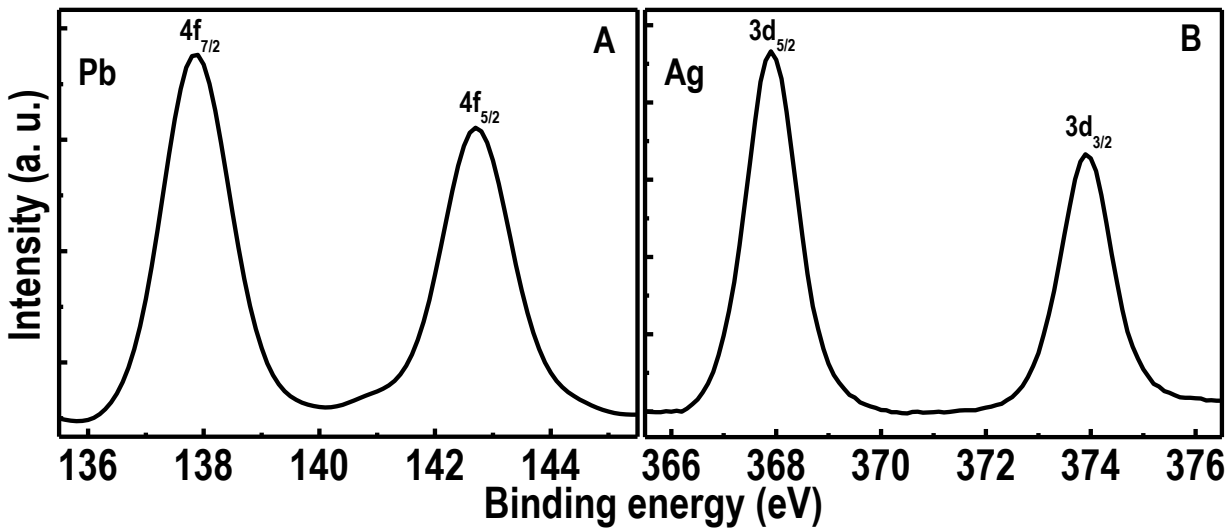


**Fig. S9** Expanded XPS spectra in the Pb 4f (A) and Ag 3d (B) regions of $Pb^{2+}$-reacted $Ag_2Te$ NWs.

**Supporting information 10**

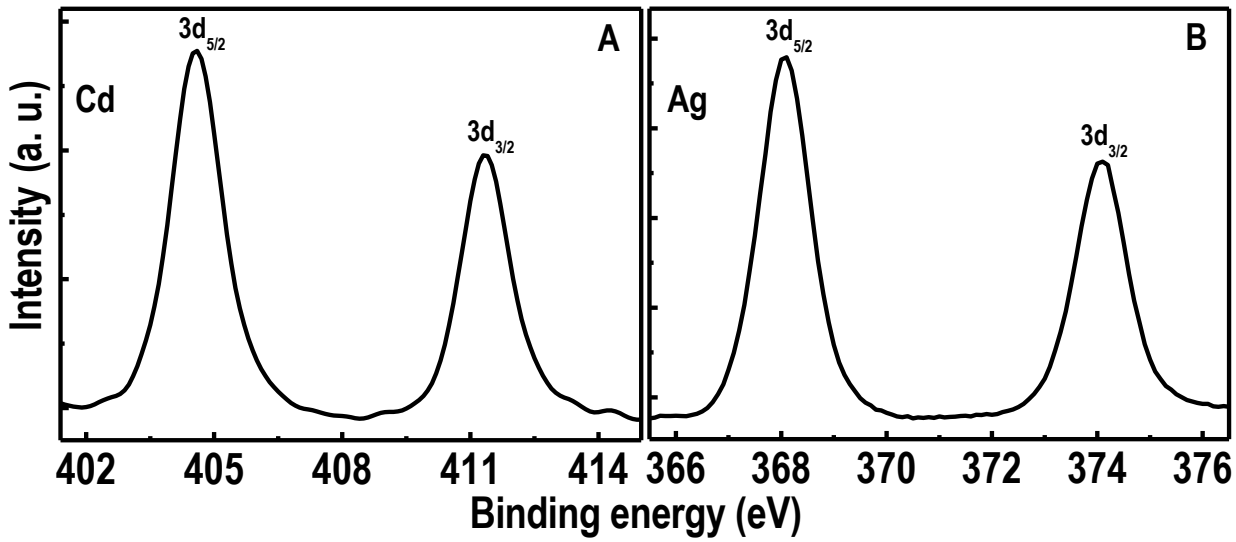


**Fig. S10** Expanded XPS spectra in the Cd 3d (A) and Ag 3d (B) regions of $Cd^{2+}$-reacted $Ag_2Te$ NWs.

**Supporting information 11**

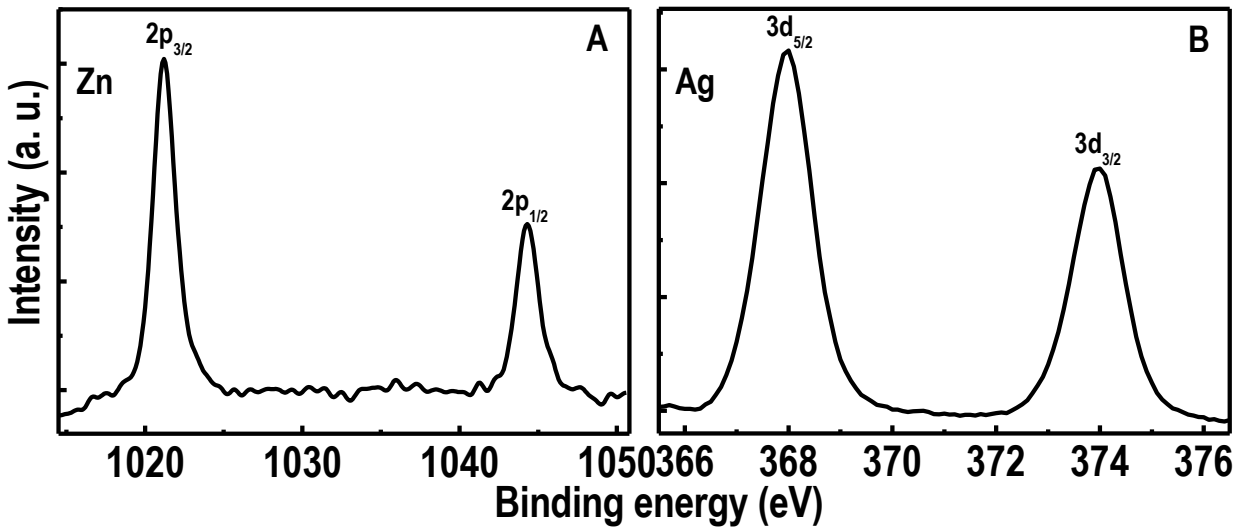


**Fig. S11** Expanded XPS spectra in the Zn 2p (A) and Ag 3d (B) regions of $Zn^{2+}$-reacted $Ag_2Te$ NWs.

**Supporting information 12**

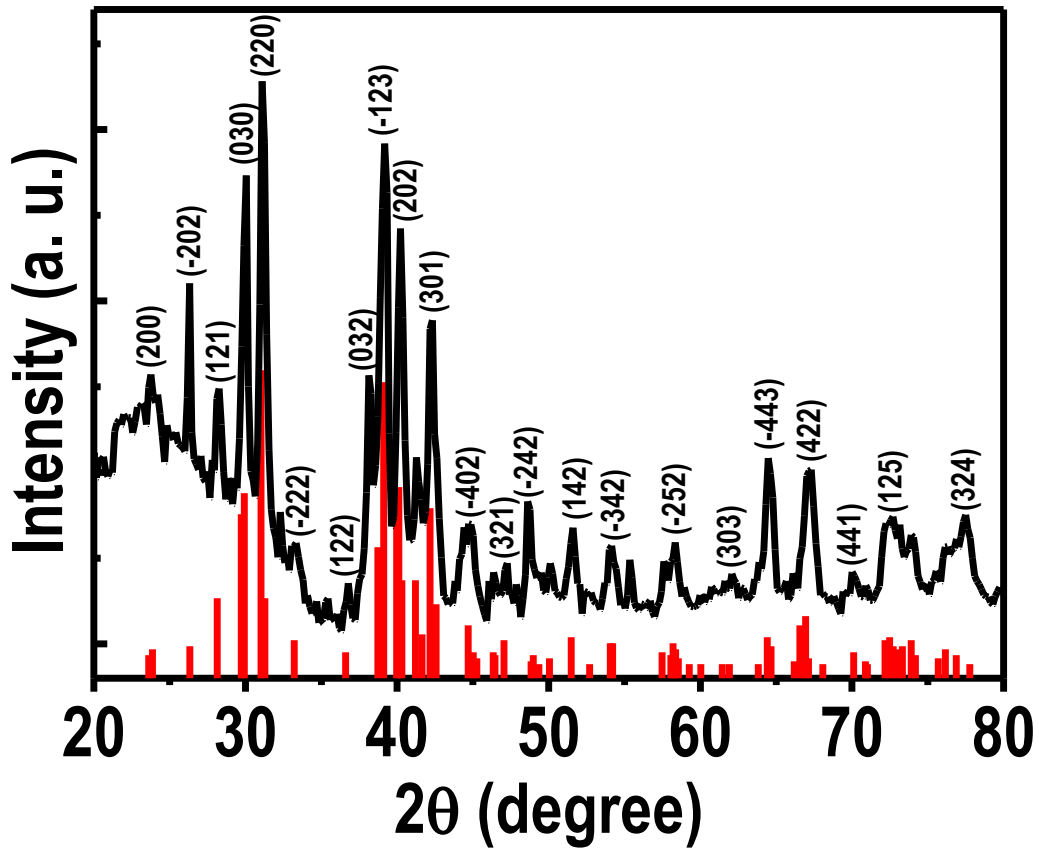


**Fig. S12** XRD patterns of $Hg^{2+}$ added to $Zn^{2+}$-reacted $Ag_2Te$ NWs (black trace), indicating no change occurred after the addition of $Hg^{2+}$. Standard peaks of $Ag_2Te$ (JCPDS: 34-0142) is given as stick spectrum.