Electronic Supplementary Material (ESI) for Nanoscale.


Supplementary Information for:

# The Structural Conversion from α-$AgVO_3$ to β-$AgVO_3$: Ag Nanoparticle Decorated Nanowires with Application as Cathode Materials for Li-ion Batteries

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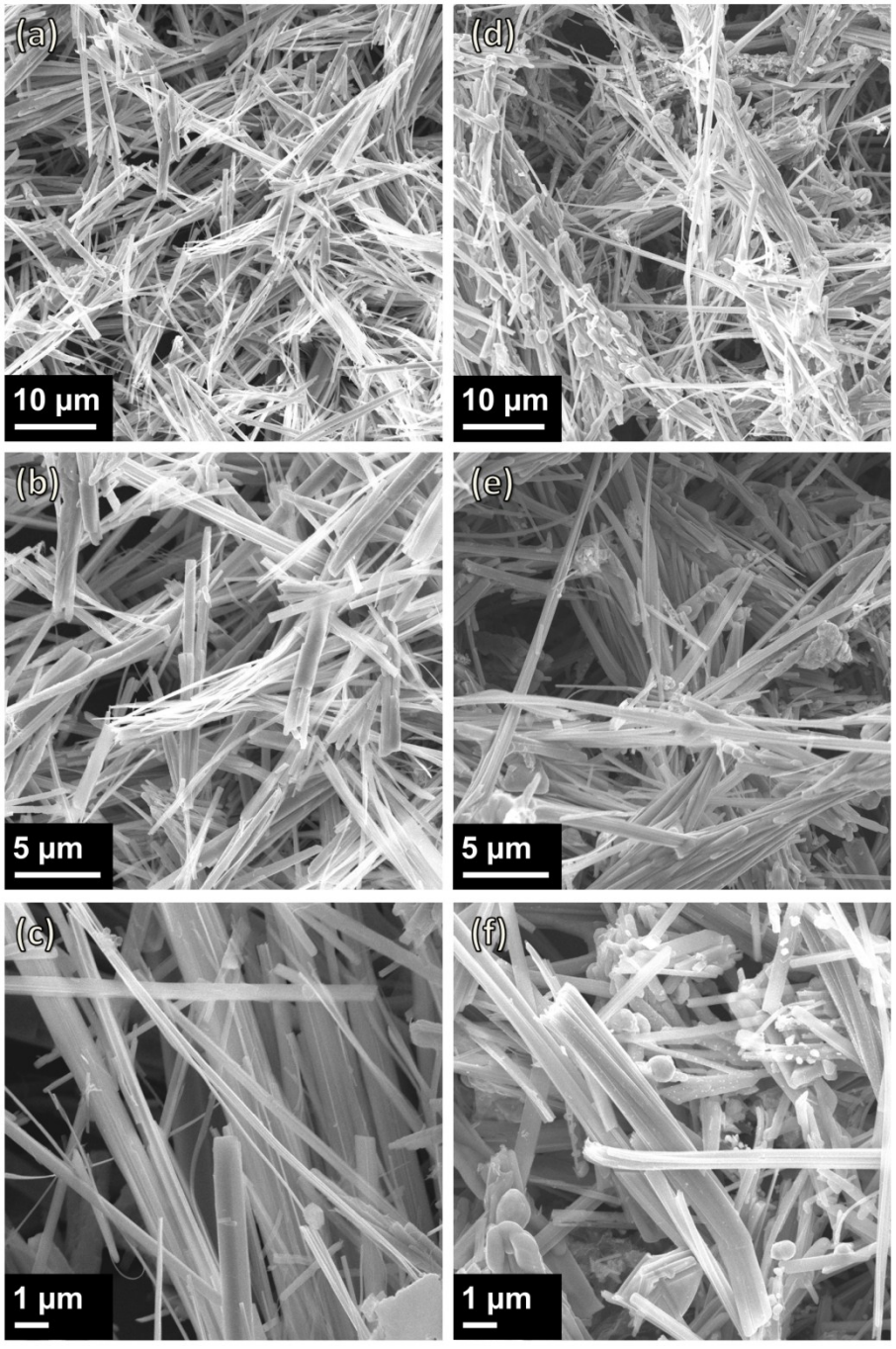


**Figure S1** SEM images of (a-c) α-$AgVO_3$ and (d-f) β-$AgVO_3$ NWs at different magnifications.

A series of EEL spectra were acquired over multiple areas as shown in Figure S2. Areas 1 – 8 and 17 – 24 represent regions of the NW above and below the interface with an Ag NP respectively, whereas areas 9 – 16 represent a region of the NW moving from an Ag NP, across the interface between the NP and the NW to the core of the NW. The EEL spectrum for area 9 and 10 represent an Ag NP and confirms that the NP is Ag metal and does not contain a silver vanadium oxide (SVO) compound. The transition from low intensity peaks at the interface (area 11) to high intensity energy loss just beyond the interface (area 12) suggests that the NP-NW interface may contain amounts of both pure Ag metal and SVO. Across the surface of a typical heated β-$AgVO_3$ NW, the binding energies for the vanadium $L_{2,3}$ edges increase and the oxygen *K* edges decrease. The EEL spectra acquired on regions of the outer surface of the NW without Ag NPs (i.e. areas 4 – 6 and 20 – 22) are in close agreement with each other. Likewise the EEL spectra acquired on the core of the NW (i.e. areas 8, 16 and 24) are in close agreement with each other. This again suggests that β-$AgVO_3$ NWs have a core-shell like structure with vanadium present in different oxidation states on the outer surface and the inner core, with the vanadium oxidation state under Ag NPs being similar to that of the core of the NW.

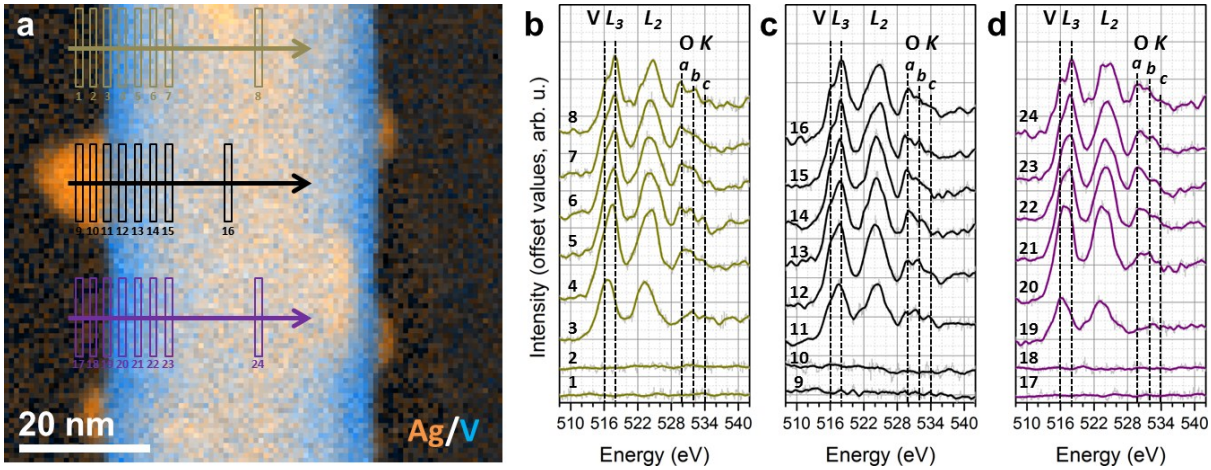


**Figure S2.** (a) an overlay of V L and Ag M edge maps demonstrating the distribution of V and Ag in the β-$AgVO_3$ NWs, (b), (c) and (d) EEL spectra acquired from the 24 areas of the β-$AgVO_3$ NW highlighted in (a).