

Supporting information

1. Preparation of β -AgVO₃ nanoribbons

All the chemicals were of analytical grade and used without further purification. The synthesis was performed in a simple hydrothermal process. AgNO₃ (0.020 g) and NH₄VO₃ (0.058 g) were dissolved in 60 ml deionized water under ultrasonic vibration. After ultrasonication for 20 min, the resulted mixture was transferred into a Teflon-lined stainless steel autoclave, which was sealed and heated to 190 °C for 16 h. The system was then allowed to cool to room temperature. The collected product was filtrated and washed with deionized water, then dried under vacuum at 55 °C.

2. Characterization.

The phase structure and morphology of the products were investigated via the application of X-ray diffraction (XRD), scanning electron microscopy (SEM), and transmission electron microscopy (TEM). XRD patterns were recorded by a Shimadzu XRD-6000 X-ray diffractometer equipped with Cu K α radiation ($\lambda = 0.15406$ nm), and a scanning rate of 0.02 °s⁻¹ was applied to record the patterns in the 2 θ range of 10–80°. SEM images were taken with a Hitachi S-4800 field emission scanning electron microscope. TEM and high resolution transmission electron microscope (HRTEM) images were investigated with a JEOL-2010 transmission electron microscopy, using an accelerating voltage of 200 kV.

SERS spectra were recorded with a Labram-HR confocal laser micro-Raman

spectrometer equipped with an argon ion laser with excitation of 514.5 nm. An air-cooled CCD was used as the detector, the accumulation time was 1 s and the incident power was 3 mW. The spot size of the laser was 1 μm in diameter using a 50x objective.

3. XRD patterns of $\beta\text{-AgVO}_3$ and production of mechanochemical reaction

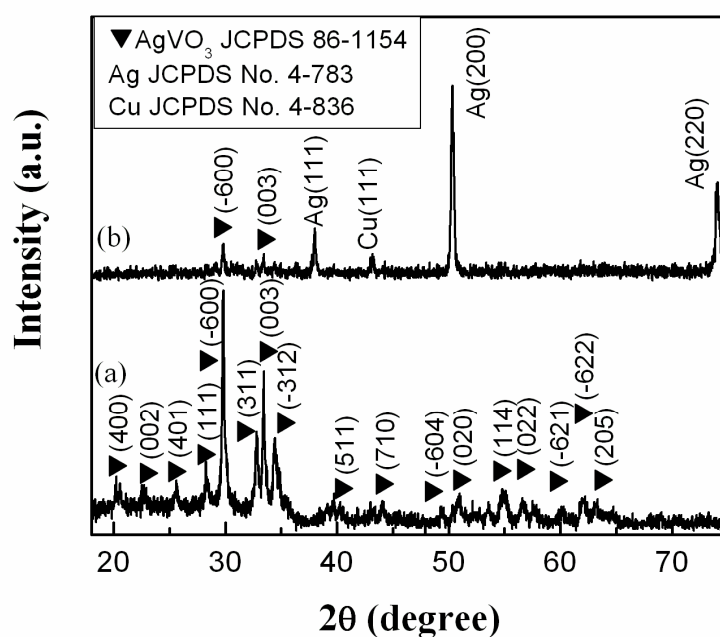


Figure S1 (a) XRD pattern of the as-prepared products showing monoclinic phase of $\beta\text{-AgVO}_3$ nanoribbons and (b) their chemical reduction to silver nanoparticles on copper foil.

Figure S1a shows the typical XRD patterns of the as-prepared $\beta\text{-AgVO}_3$ nanoribbons. All the diffraction peaks in Figure S1a can be readily indexed to $\beta\text{-AgVO}_3$ with the monoclinic phase (JCPDS 86-1154). No peaks from other phases have been detected,

indicating that the products are of high purity. Figure S1b shows the XRD pattern of the products when β -AgVO₃ reacted with copper foil via mechanochemical method. There exists the peak of silver with the cubic structure (JCPDS 04-0783) and Cu with the cubic structure (JCPDS 04-0836), besides those of β -AgVO₃.

4. HRTEM image of SVN

The HRTEM image of a single silver vanadate nanoribbon (Figure S2) reveals clear crystal lattice along the whole nanoribbon, which indicates high quality of crystallinity. The crystal lattice of SVN may be indexed as (201) and (-112) crystal planes.

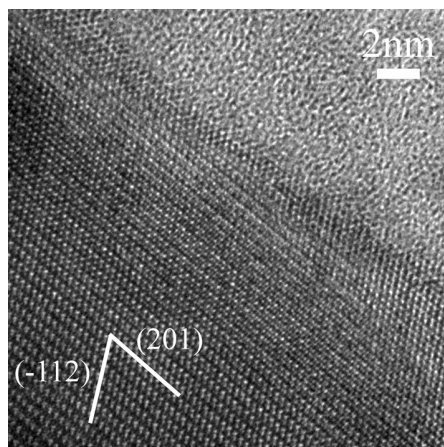


Figure S2 HRTEM image of silver vanadate nanoribbon showing clear crystal lattice, which may be indexed as (201) and (-112) crystal planes.

5. The preparation of substrate and the Raman detection

Copper foil was cut into 10 mm × 10 mm pieces in size and washed with acetone, ethanol, and distill water in an ultrasonic apparatus for 5 min successively; and dry naturally. Then 0.001 g AgVO₃ nanoribbons was added onto the copper foil and ground for 1 minute. Then 25 μl analyte was added slowly and dried for SERS.

6. The SEM image of substrate

Figure S3 shows the SEM image of substrate, which was obtained using the reaction between AgVO₃ nanoribbons of copper via a mechanochemical method. There are many silver nanoparticles with average diameter of 15 nm (marked with arrows), in addition to the AgVO₃ nanoribbons.

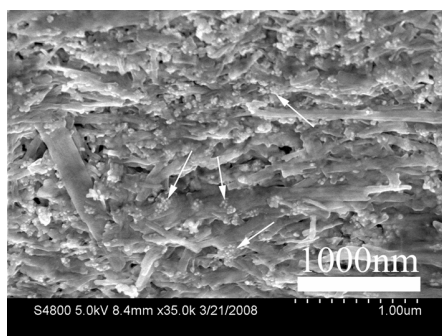


Figure S3 The SEM image of substrate

7. The Raman spectrum of substrate

Figure S4 shows the Raman spectrum of substrate, which reveals a broad peak between 760 and 920 cm^{-1} . The band is related to stretching vibrations of vanadates with fourfold coordination of oxygen atoms around the vanadium atom.^{S1} The signals are quite weak compared with those of SERS in Figure 2.

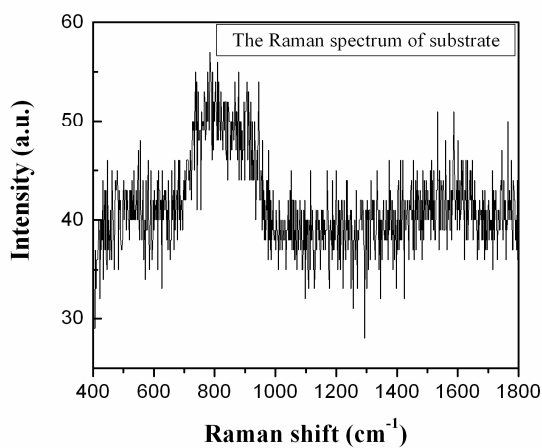


Figure S4 Raman spectrum of substrate

S1 R. Lewandowska, K. Krasowski, R. Bacewicz and J.E. Garbarczyk, *Solid State Ionics*, 1999, **119**, 229.