

1. Experimental section

In a typical synthesis, 6.6g of $\text{Na}_2\text{WO}_4 \cdot \text{H}_2\text{O}$ was first dissolved in 150ml of deionised water, then this solution was put into an ice bath for 30min. After that, 15ml of 3M HCl was added drop-wise into the solution to form a white tungstic acid precipitate. 30ml of $\text{H}_2\text{C}_2\text{O}_4$ solution (containing 3.8g $\text{H}_2\text{C}_2\text{O}_4$) was also added to the solution and diluted to 250ml. After this a transparent tungstic acid colloidal solution was formed. 15ml of this tungstic acid sol was transferred to a 20-ml autoclave, then a certain amount of Li_2SO_4 (0.1-10g) was added, sealed, and maintained at 120-180°C for 2-48h. The precipitate was then filtered, washed with water and alcohol several times to remove ions possibly remnant in the final products, and dried at 60°C in air. Following the above procedures, high yield and high purity of hexagonal phase WO_3 nanowire bundles were obtained. In order to study the possible chemical process in WO_3 synthesis, the experimental parameters have been varied during the synthesis.

2. SEM and TEM images of the nanowire bundles

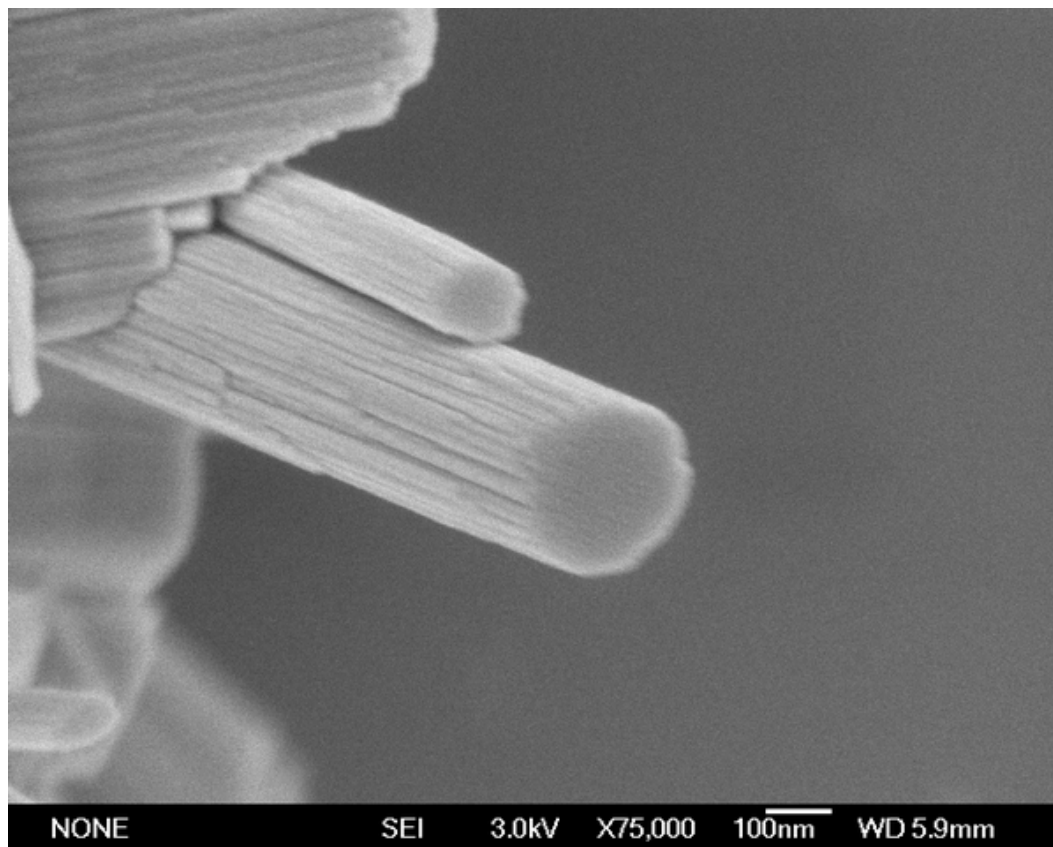


Figure 1. SEM image of a typical side view of nanowire bundle.

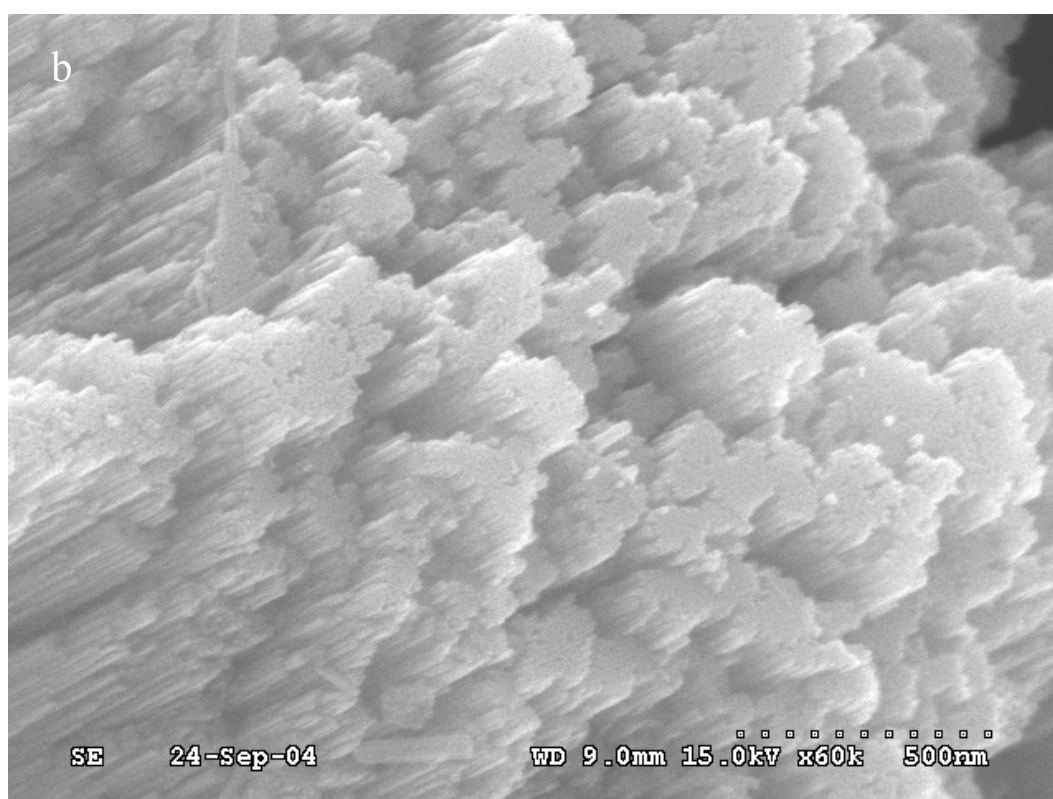
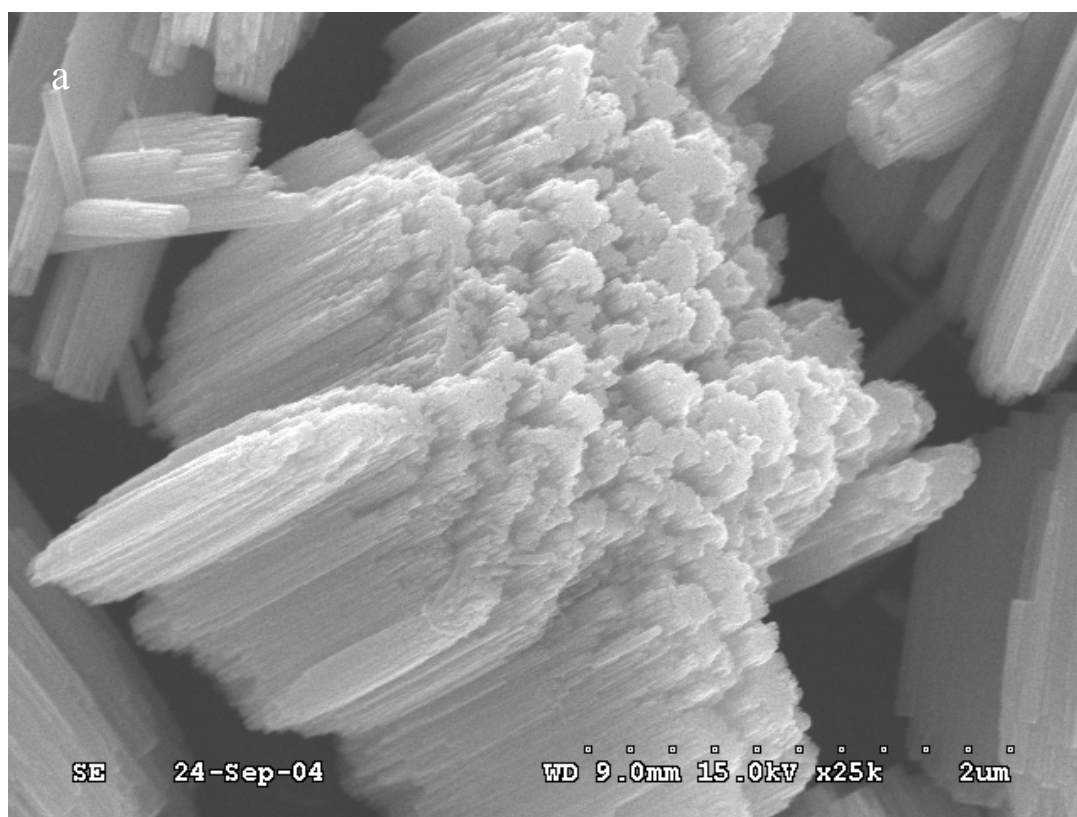


Figure 2. SEM images of irregularly aggregated nanowires a) Low magnification. b) High magnification.

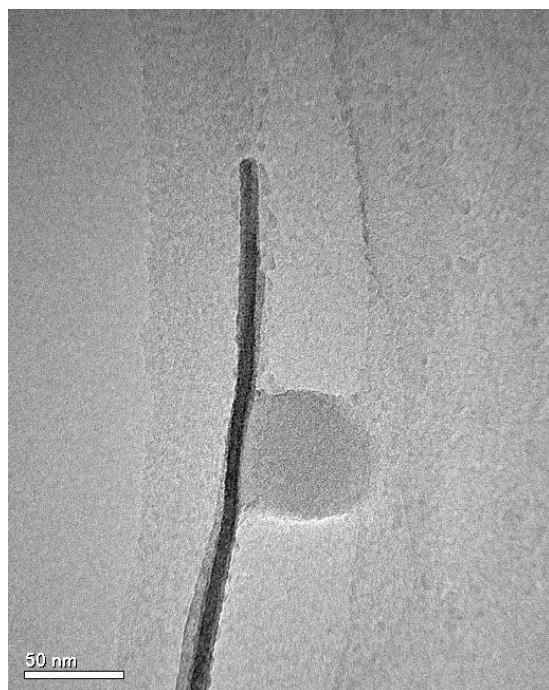


Figure 3. TEM image of a single nanowire with diameter about 10 nm.

3. XRD patterns of the WO_3 synthesized by adding different amount of the sulfate

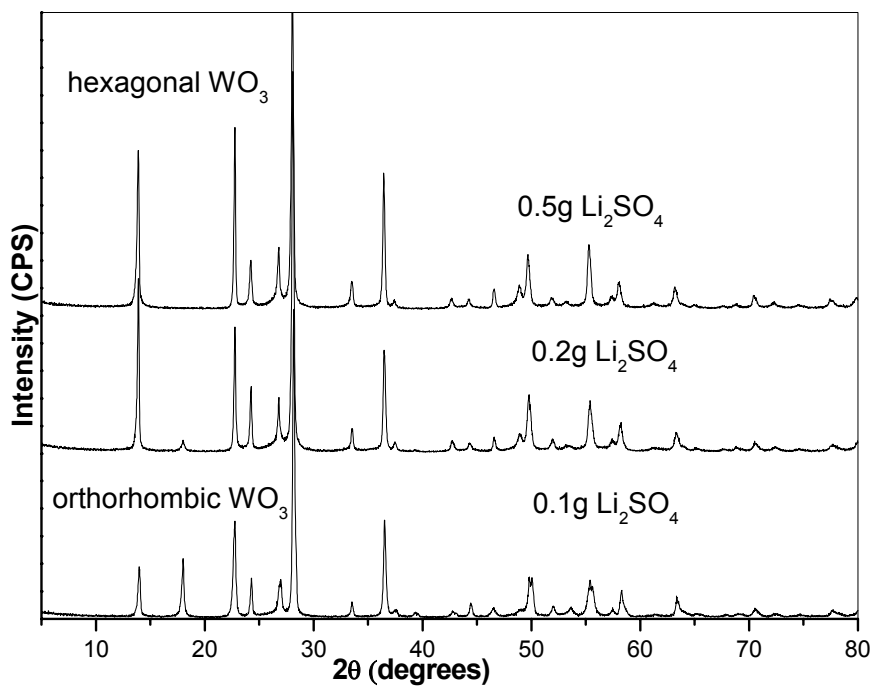


Figure 4. XRD patterns for the products prepared by adding different amount of sulfates.

4. BET surface area of the products

Nitrogen adsorption of the sample was measured at 77 K with an ASAP 2010 Micromeritics apparatus. The N₂ Brunauer-Emmett-Teller (BET) surface area of as-synthesized products was determined to be 11 m²g⁻¹.

5. TG analysis of the products

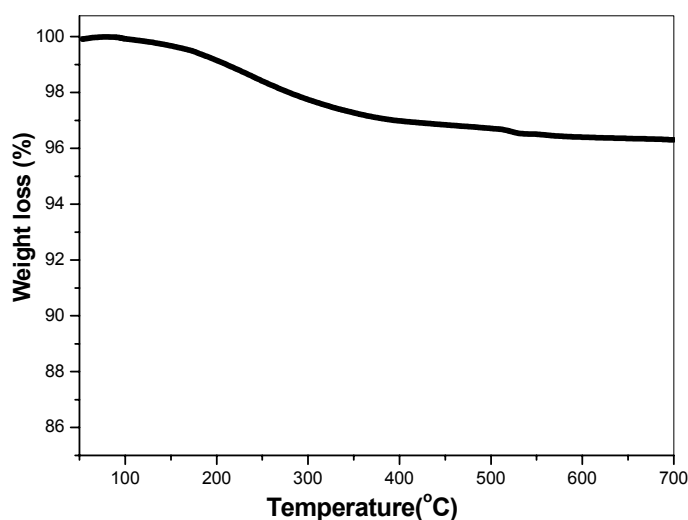


Figure 5. TG curve of the products in the range of 50-700 °C performed on a PERKIN-ELMER TGA7 at a heating rate of 20 K min⁻¹. The sample lost only 3% of its weight when being heated to 400 °C due to the desorption of the structural water according to the literature. Almost no weight loss was observed in the range of 400-700 °C. This means that few organics are contained in our final products.