Experimental Section

Synthesis of SnS_2 nano/microstructures All the chemicals were of analytical grade and used without further purification. In a typical synthesis of SnS_2 nanoplates, 0.35 g of tin tetrachloride pentahydrate ($SnCl_4 \cdot H_2O$) and 0.6 g of KSCN were first dissolved into 25 mL of distilled water under mild stirring. Then, the above solution was transferred into a 33 mL Teflon-lined stainless steel autoclave, sealed, and then heated to 180 ºC for 20 h. Finally, the resulting product was centrifuged, rinsed with distilled water, and finally dried at 60 ºC in a vacuum for characterization. The synthetic procedure for flower-like SnS_2 microspheres was the same as that for SnS_2 nanoplates except that 0.525 g of $SnCl_4 \cdot H_2O$ and 1.0 g of KSCN were used.

Characterization The X-ray diffraction (XRD) patterns of the products were recorded with Rigaku D/max Diffraction System using a Cu Kα source (λ = 0.15406 nm). The scanning electron microscopy (SEM) images were taken with a JEOL JSM-6700F field emission scanning electron microscope (15 kV). The transmission electron microscopy (TEM) and high-resolution transmission electron microscopy (HRTEM) images were taken on a JEOL 2010 high-resolution transmission electron microscope performed at 200 kV. The specimen of HRTEM measurement was prepared via spreading a droplet of ethanol suspension onto a copper grid, coated with a thin layer of amorphous carbon film, and allowed to dry in air.

Electrochemical measurements Electrochemical studies were characterized by using CR2016-type coin cells. The negative (anode) electrode consisted of 70 wt % active material, 15 wt % Super P as sconductivity agent, and 15 wt% polymer binder on a copper foil. Test cells were assembled in an argon-filled glove box with water and oxygen contents less than 1 ppm. Li foil was used as counter electrode, polypropylene (PP) film (Celgard 2400) as separator. The electrolyte was 1 M $LiPF_6$ (EC: DC: DMC = 1:1:1). The electrochemical performances of the cells were evaluated within the potential range of 0.05-1.2 V versus Li/Li^+. Both charge and discharge were carried out galvanostatically at current density of 100 mA/g of SnS_2.

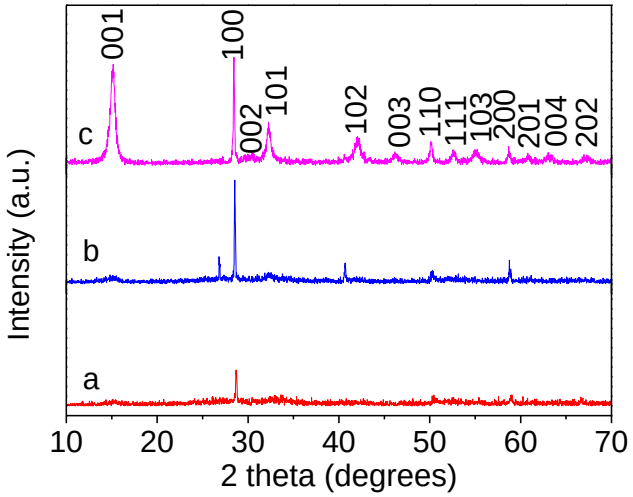

Fig. 1 XRD patterns of as-synthesized flower-like microspheres obtained by hydrothermal treatment for different time: (a) 2 h; (b) 5 h; and (c) 20 h.

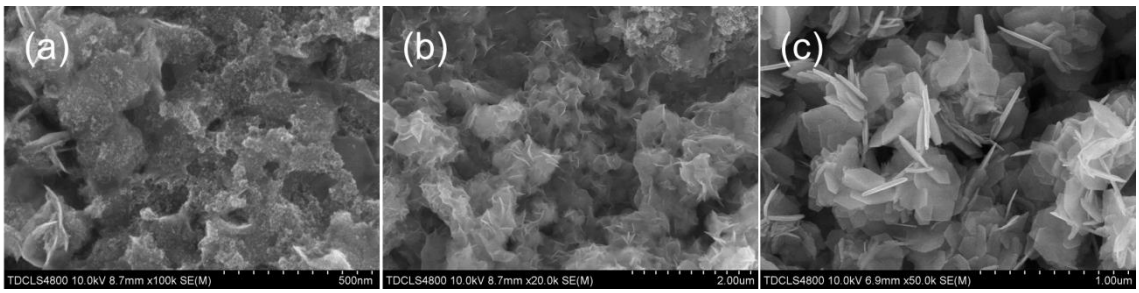

Fig. 2 SEM images of as-synthesized flower-like microspheres obtained by hydrothermal treatment for different time: (a) 2 h; (b) 5 h; and (c) 20 h.

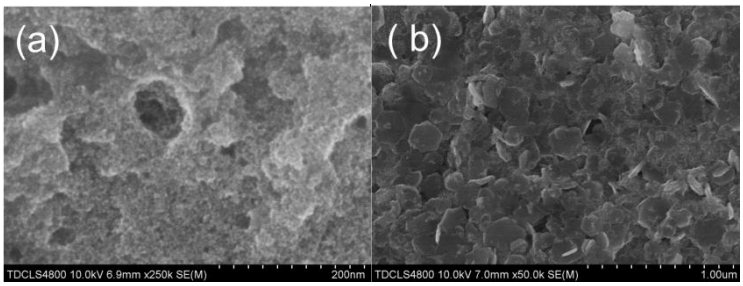

Fig. 3 SEM images of as-synthesized nanoplates obtained by hydrothermal treatment for different time: (a) 1.5 h and (b) 4h.