Supplementary Material (ESI) for Journal of Materials Chemistry

Electronic Supplementary Information

Introduction

Comparison of SEM and TEM images for the same mesostructure

In Figure S1, the TEM and SEM image of the same 2D hexagonal mesostructure were taken ((a) and (b), respectively) at the same position. The SEM image shows a solid picture of the sample and obviously present a clear mesostructure on the external surface of the sample, while the structure can not be observed by TEM.

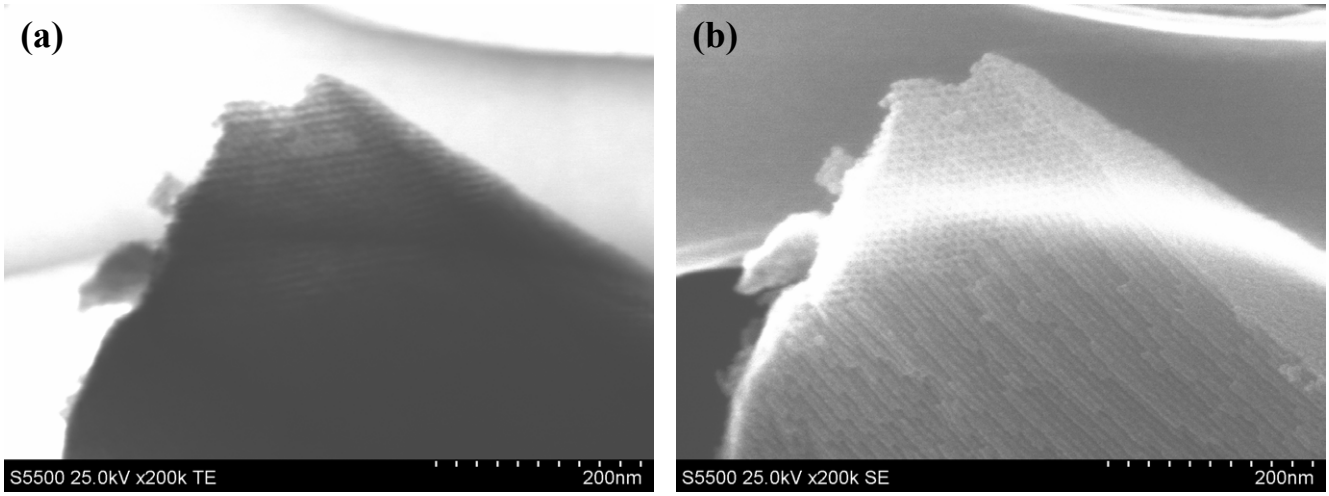

Figure S1: (a) TEM image and (b) SEM image of the same 2D hexagonal mesoporous silica sample prepared by scratching thin film from the substrate.

Results & Discussion

The top and cross-sectional HRSEM images of the lamellar silica film after calcination

The HRSEM images of the lamellar silica films after calcination are shown in Figure S2. The top view in Figure S2(a) displays a smooth surface, as the image shown in Figure 1(b). The cross-sectional view in Figure S2(b) displays no structure, in contrast to Figure 1(c) showing a layered structure for the as-synthesized film.

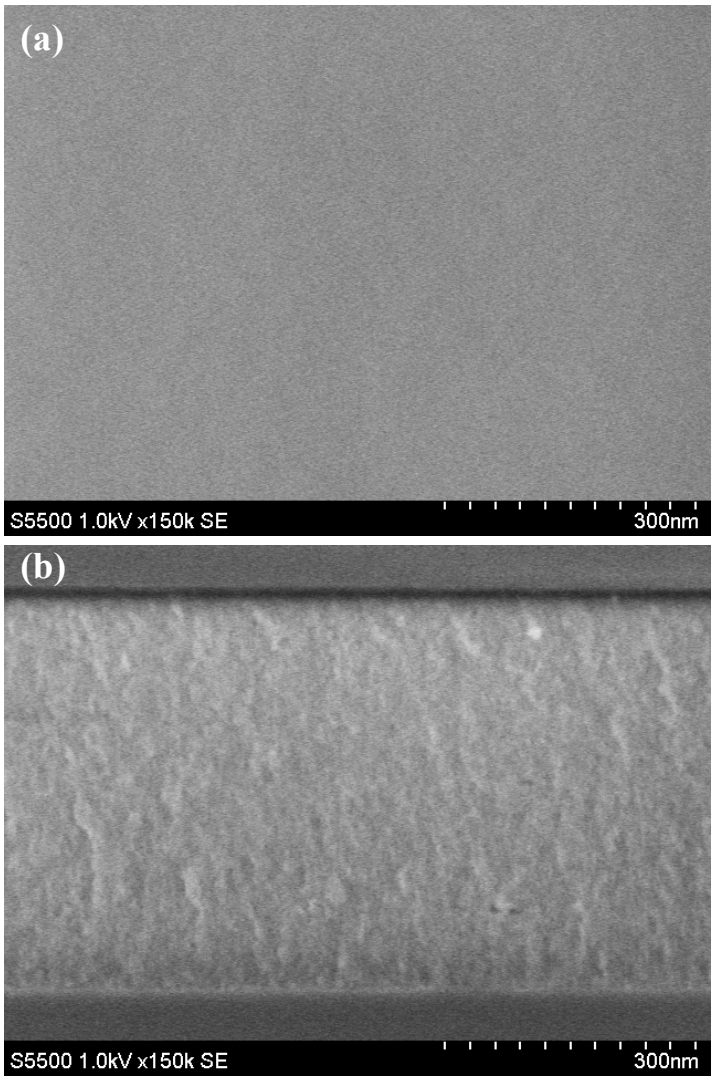

Figure S2: HRSEM images of the lamellar silica thin films in (a) top and (b) cross-sectional views after calcination.

Determination of 2D hexagonal mesostructure

In Figure 3a, the XRD patterns of the 2D hexagonal mesostructured silica films before calcination show two peaks with d-spacing of 9.8 and 5.0 nm. If we assume the d-spacing of the first peak as the (10) diffraction of the 2D hexagonal structure with the mesochannels parallel to the substrate, the value of 9.8 nm corresponds well to the value of 9.6 nm derived from the TEM image in Figure S3.

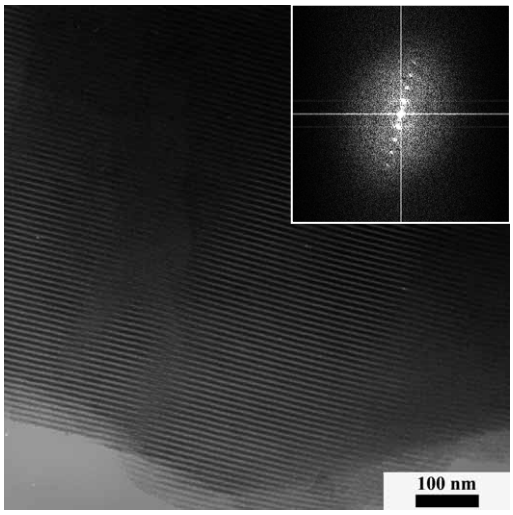

Figure S3: TEM image of the 2D hexagonal mesoporous silica thin film before calcination. The corresponding FFT diffractogram is shown in the inset.

The top and cross-sectional HRSEM images of the 3D hexagonal silica films before calcination

The HRSEM images of the 3D hexagonal silica films before calcination are shown in Figure S4. The top view in Figure S4(a) displays a 2D structure, as the image shown in Figure 7a. The cross-sectional view in Figure S4(b) also displays a 2D structure. This cross-sectional view indicates that the as-synthesized film exhibits circular pores, in contrast to the calcined film exhibiting ellipsoidal pores (Figure 7(b)).

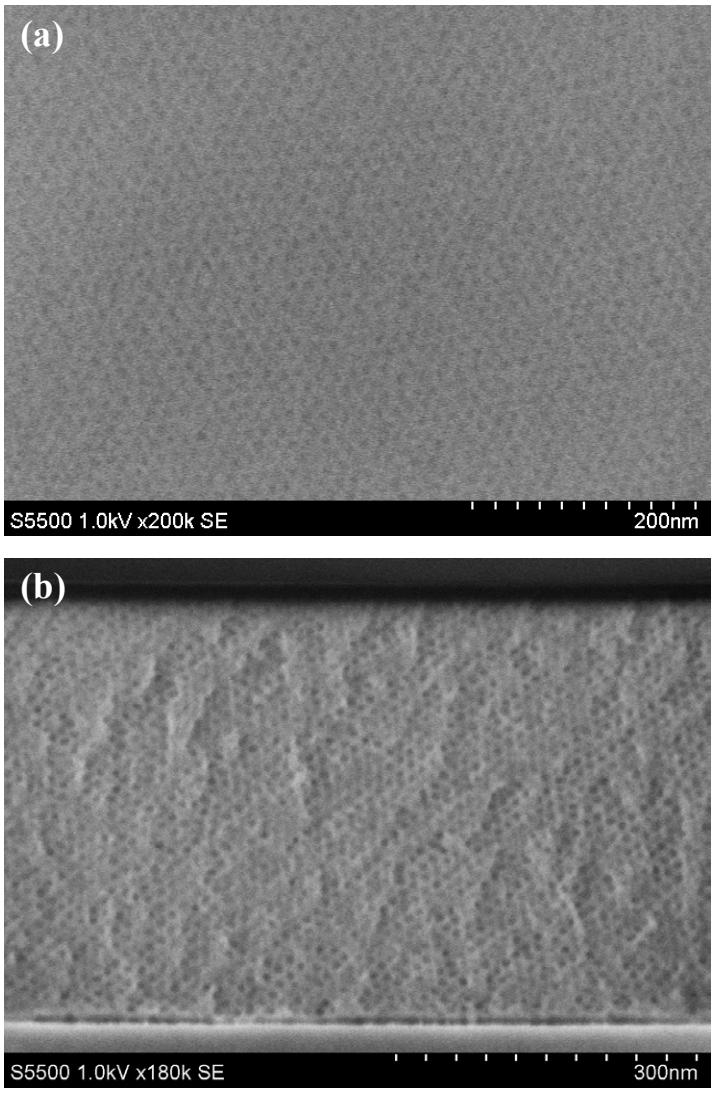

Figure S4: HRSEM images of the 3D hexagonal silica thin films in (a) top and (b) cross-sectional views before calcination.