Supporting information

Boric acid assisted formation of mesostructure silica: from hollow spheres to hierarchical assembly

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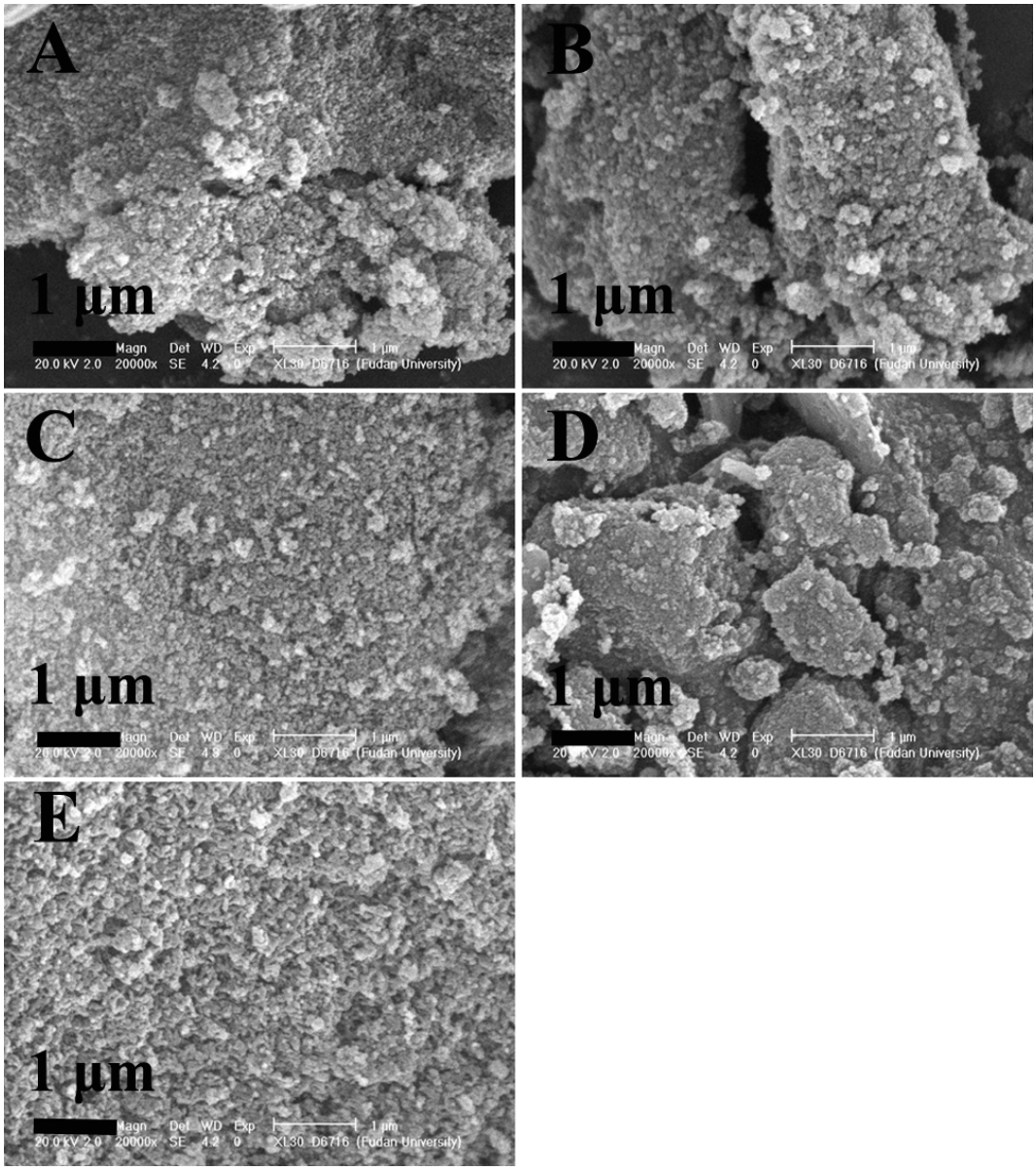

Fig. S1 SEM images of mesostructure silica: (A) S1, (B) S2, (C) S3, (D) S4 and (E) S5. The mesostructure silica (S1 to S5) are prepared by using different CTAB amount (0.02, 0.04, 0.06, 0.1 and 0 g) and P123 (0.1 g) as the template and TEOS (0.5 mL) as the silica precursor in boric acid solution (1.3 mol/L).

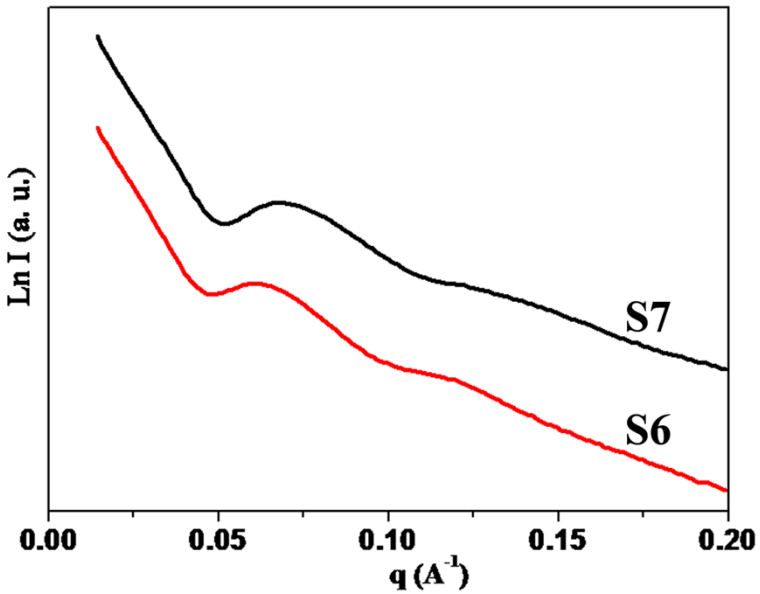

Fig. S2 SAXS pattern of mesostructure silica (S6 and S7) prepared by using CTAB (0.02 g) and P123 (0.1 g) as template and TEOS (0.5 mL) as the silica precursor in different concentration of boric acid solution (0.32 and 2.5 mol/L).

Fig. S3 Photographs of the solution after reaction at 40 °C for 80 h. The samples are prepared by using CTAB (0.02 g) and P123 (0.1 g) as template and TEOS (0.5 mL) as the silica precursor in different acidic medium (boric acid and acetic acid) at the pH value of 3.

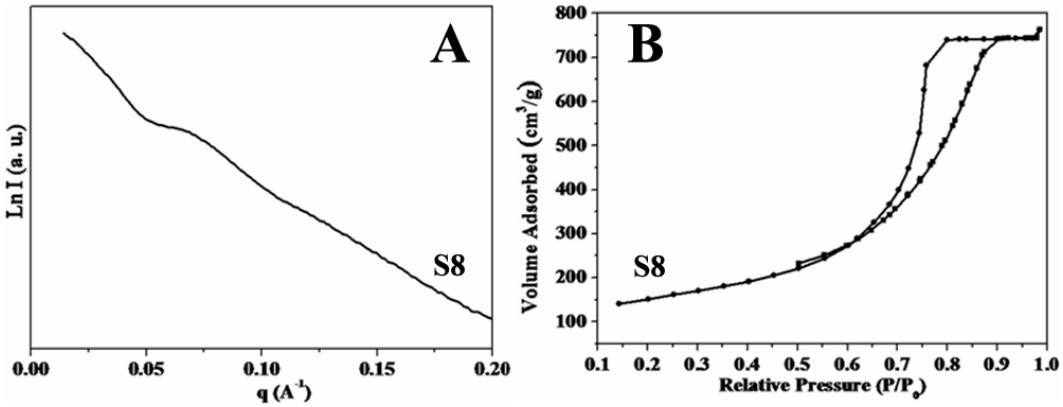

Fig. S4 SAXS pattern (A) and N_2 sorption isotherm curve (B) of mesostructure silica S8. The mesostructure silica S8 sample is prepared by using CTAB (0.02 g) and P123 (0.1 g) as template and low volume of TEOS (0.25 mL) as the silica precursor in boric acid solution (1.3 mol/L).

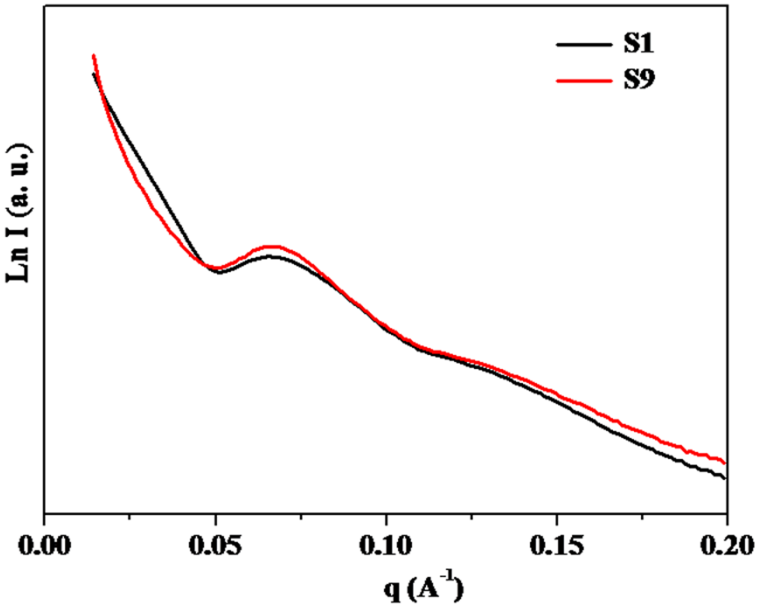

Fig. S5 SAXS patterns of mesostructure silica S1 and S9. The mesostructure silica S9 sample is prepared by using CTAB (0.02 g) and P123 (0.1 g) as template, TEOS (0.5 mL) as the silica precursor and $MgSO_4$ (0.35 g) as the inorganic salt in boric acid solution (1.3 mol/L).

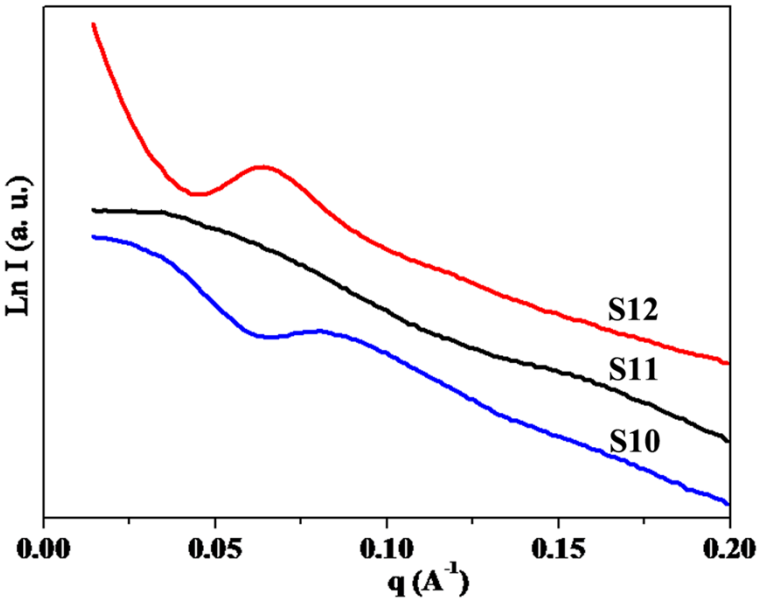

Fig. S6 SAXS patterns of mesostructure silica S10, S11 and S12. The mesostructure silica samples (S10, S11 and S12) are prepared by using high concentration of surfactants: CTAB (0.2, 1.0 and 0 g) and P123 (1.0, 0 and 1 g), and TEOS (2.5 mL) as the silica precursor in boric acid solution (1.3 mol/L).

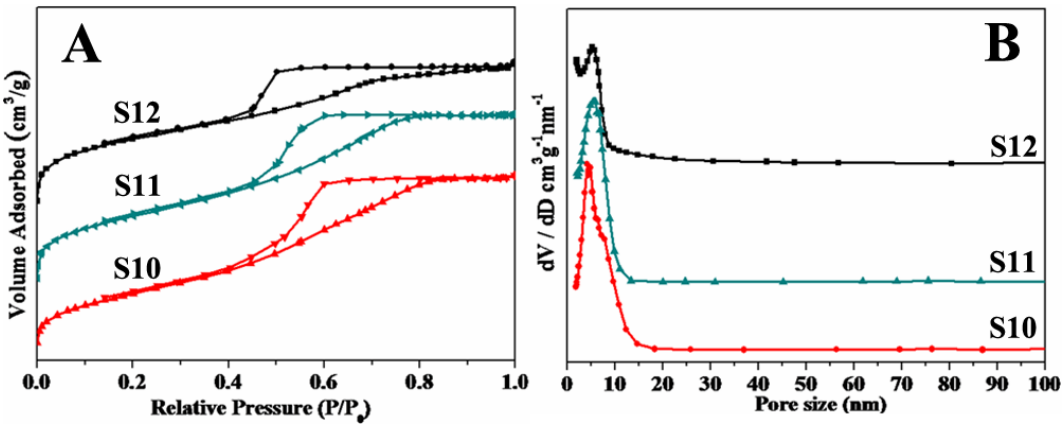

Fig.S7 N_2 sorption isotherm curves (A) and pore size distribution plots (B) of mesostructure silica S10, S11 and S12. Isotherm and pore size distribution curves are shifted for clarity. The mesostructure silica samples (S10, S11 and S12) are prepared by using high concentration of surfactants: CTAB (0.2, 1.0 and 0 g) and P123 (1.0, 0 and 1 g), and TEOS (2.5 mL) as the silica precursor in boric acid solution (1.3 mol/L).

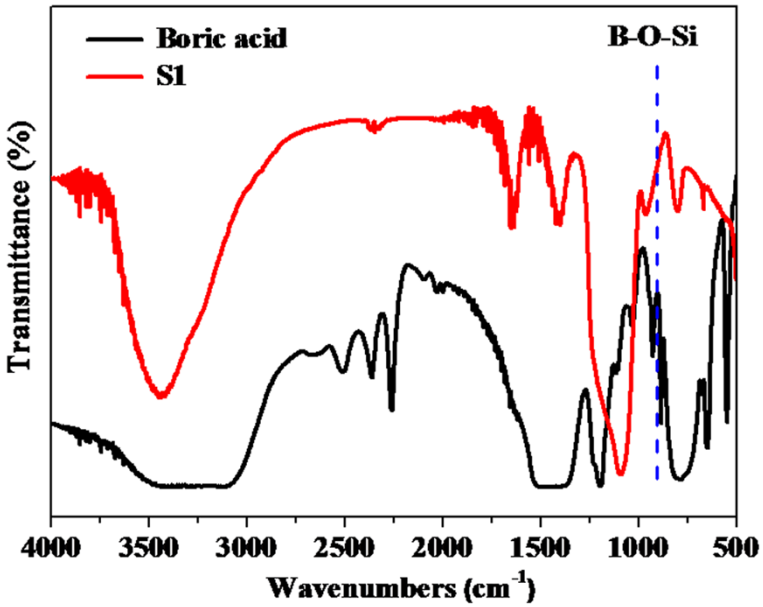

Fig. S8 Fourier transform infrared (FTIR) spectra of boric acid and mesostructure silica S1. The characteristic bands of boric acid (550, 884 and 1192 cm^{-1}) and the peak of B-O-Si (910 cm^{-1}) are not appeared in the sample S1, indicating the boron species are not detectable in the obtained mesostructure silica.