Electronic Supplementary Information (ESI)

Fabrication of lotus-leaf-like nanoporous silica flake with controlled thickness

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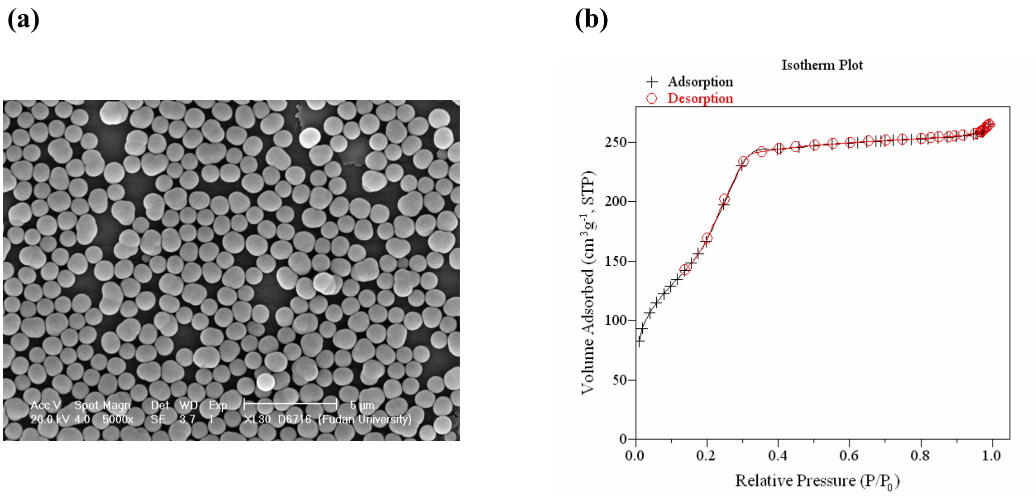


Fig. S1 SEM image (a) and N_2 sorption isotherms (b) of nanoporous silica sphere. The BET surface area and pore size of nanoporous silica sphere are 589 m^2 g^{-1} and 2.4 nm, respectively.

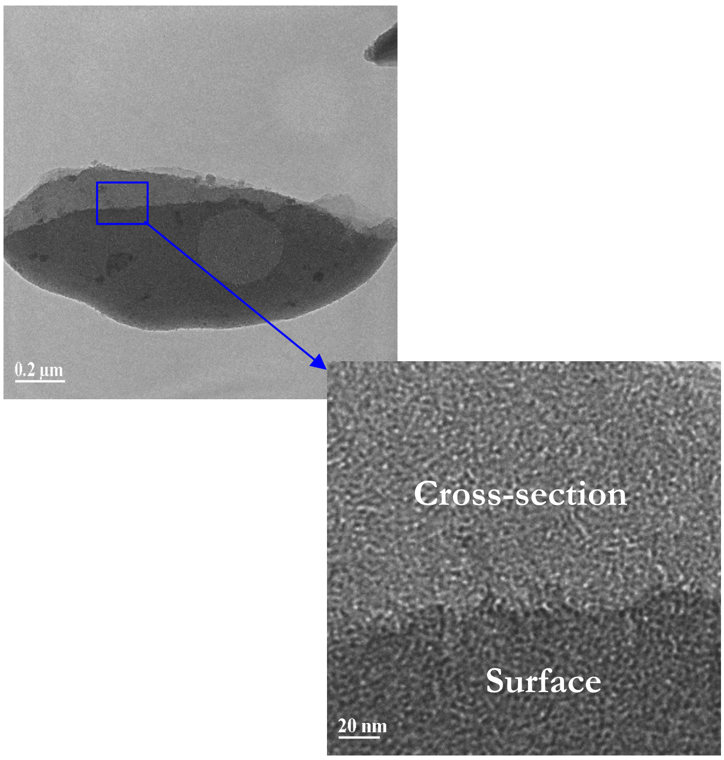
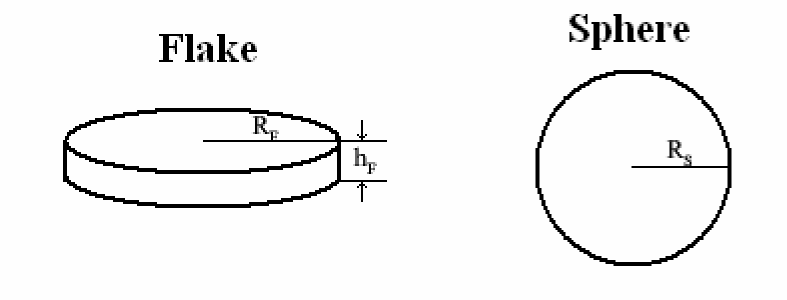


Fig. S2 TEM images of the cross-section of nanoporous silica flake.

Detailed calculation of the ratio of theoretical external specific surface area between silica flake and sphere:



Suppose that the densities of the two silica samples are equal, and then equal mass of silica samples should have equal volume: $V_F = V_S$,

$$V_F = N_F \pi R_F^2 h_F$$

$$V_S = N_S \frac{4}{3} \pi R_S^3$$ (N_F - number of flakes, N_S - number of spheres)

$$\frac{S_F}{S_S} = \frac{N_F(2\pi R_F^2 + 2\pi R_F h_F)}{N_S 4\pi R_S^2} = \frac{N_F \pi R_F^2 h_F (\frac{2}{h_F} + \frac{2}{R_F})}{N_S \frac{4}{3}\pi R_S^3 \frac{3}{R_S}} = \frac{V_F(\frac{2}{h_F} + \frac{2}{R_F})}{V_S \frac{3}{R_S}} = \frac{\frac{2}{h_F} + \frac{2}{R_F}}{\frac{3}{R_S}}$$

In this case, $h_F = 0.2$ μm, $R_F = 1.5$ μm and $R_S = 0.5$ μm, therefore,

$$\frac{S_F}{S_S} = \frac{\frac{2}{0.2} + \frac{2}{1.5}}{\frac{3}{0.5}} \approx 1.9$$