Electronic supplementary information for

Hexagonal hollow silica plate particles with high transmittance under ultraviolet-visible light

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ESI. 1. SEM images of HHSP particles corresponding to TEM images in Figure 2

The morphologies of the HHSP particles were observed using SEM, which revealed that they had a hexagonal shape. The regions of different contrast in the SEM images of the HHSP particles demonstrated that the silica particles had a hollow structure. Figure S1 shows that different shell thicknesses of HHSP could be formed by changing the TEOS concentration.

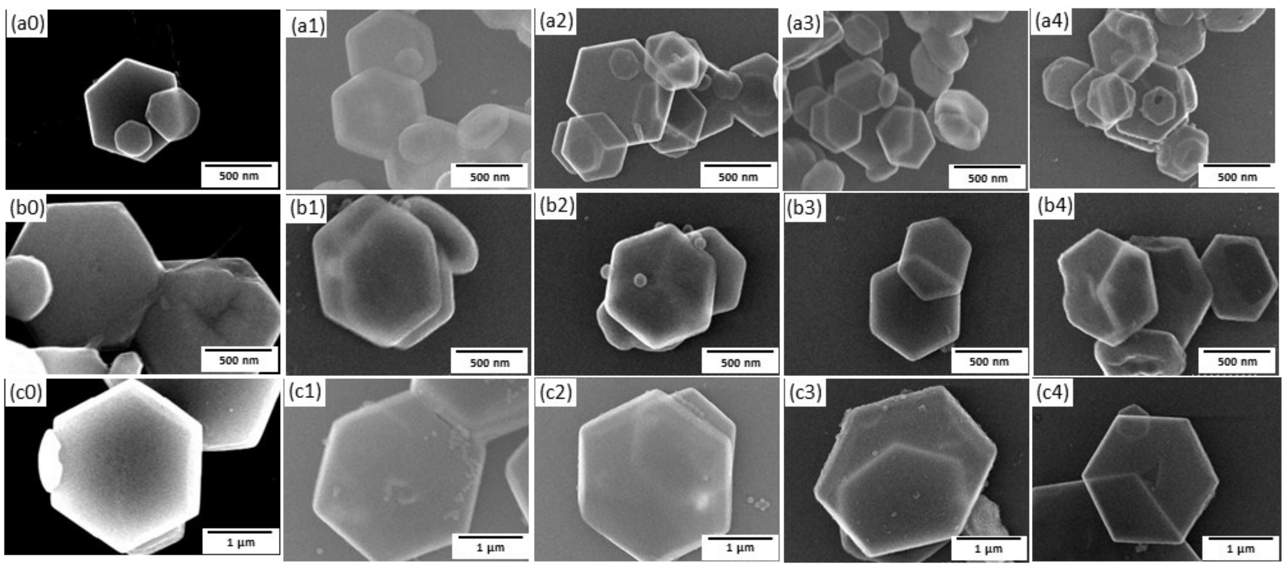

Figure S1. SEM images of ZnO templates with sizes of 0.3 μm (a0), 0.6 μm (b0), and 2 μm (c0). SEM images of HHSP particles synthesized from the respective ZnO template, using TEOS/ZnO molar ratios of 1.125 (a1–d1), 0.75 (a2–d2), 0.375 (a3–d3), and 0.2 (a4–d4).

ESI. 2. Size distribution of HHSP particles

Figure S2 shows the size distributions of HHSP particles prepared using different ZnO_2 templates. The HHSP particle size increased with increasing ZnO template size.

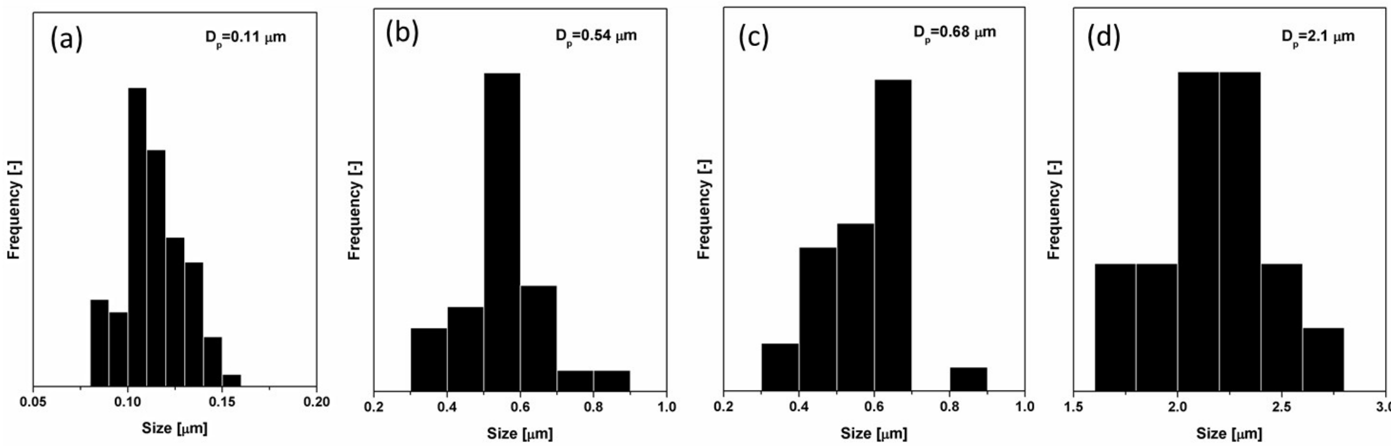

Figure S2. Particle size distributions for HHSP samples prepared using ZnO templates with sizes of 0.1 μm (a), 0.3 μm (b), 0.6 μm (c), and 2 μm (d), at a TEOS/ZnO molar ratio of 1.125.

ESI. 3. Determination of optimum TEOS/ZnO molar ratio

The effect of the TEOS/ZnO molar ratio was also investigated. Using the minimum amount of ZnO template, the TEOS concentration was varied. A higher TEOS/ZnO molar ratio influenced the secondary homogenous nucleation of TEOS, which resulted in the formation of free solid silica spheres. Decreasing the TEOS/ZnO molar ratio decreased the amount of free solid silica spheres that were formed. The maximum TOES/ZnO molar ratio that minimized the secondary nucleation of silica spheres was found to be approximately 1.125. Thus, this molar ratio was used for controlling the thickness of the hollow silica plate particles.

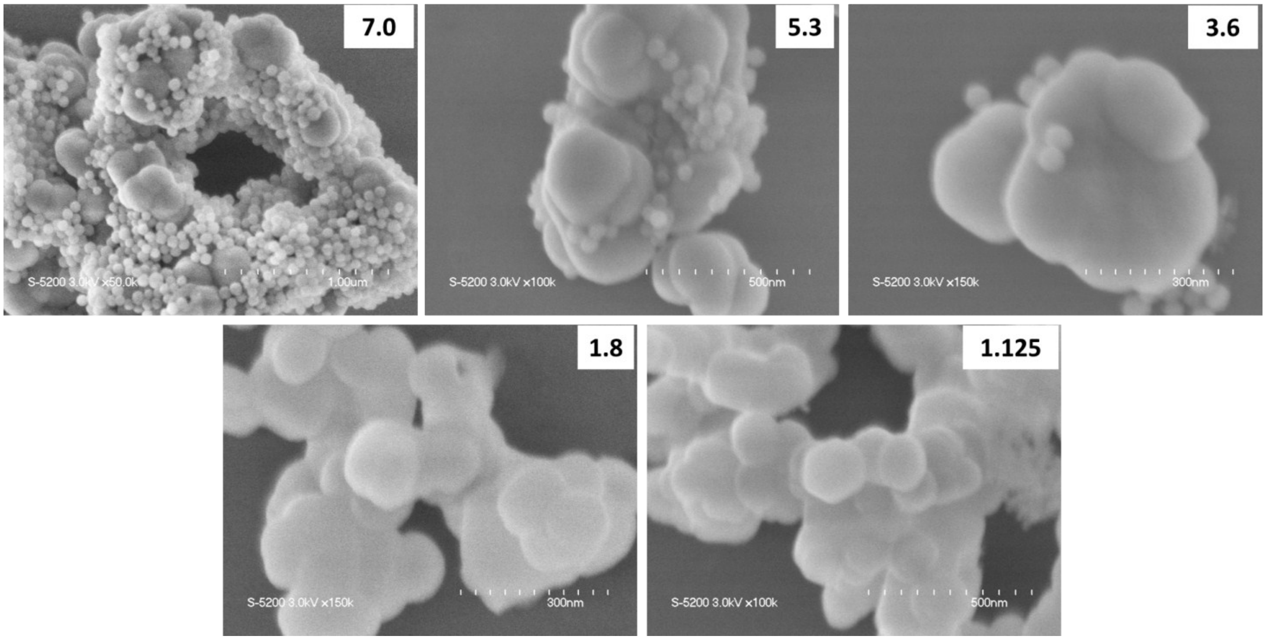

Figure S3. SEM images showing the effect of the TEOS/ZnO molar ratio on the morphology of the HHSP sample.

ESI. 4. Comparison of HHSP transmittance with reported studies

Table S1. Comparison of HHSP optical transmittance with reported studies

Reference	%Transmittance in the 300–800 nm range
HHSP sample	**99**
Ernawati et. al, 2016[1]	97.1
Xu, et. al, 2017[2]	97.1 and 98.8
Suthabanditpong, et. al, 2016[3]	85

REFERENCES

1 L. Ernawati, T. Ogi, R. Balgis, K. Okuyama, M. Stucki, S. C. Hess and W. J. Stark, *Langmuir*, 2016, **32**, 338–345.

2 J. Xu, Y. Liu, W. Du, W. Lei, X. Si, T. Zhou, J. Lin and L. Peng, *Thin Solid Films*, 2017, **631**, 193–199.

3 W. Suthabanditpong, C. Takai, M. Fuji, R. Buntem and T. Shirai, *Phys. Chem. Chem. Phys.*, 2016, **18**, 16293–16301.