

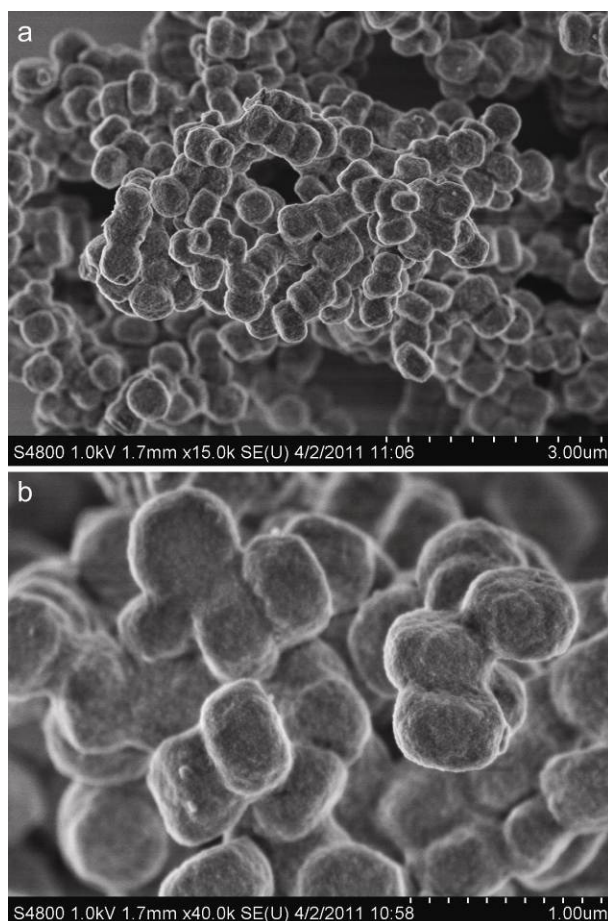
Supporting Information Available:

## A facile route to cage-like mesoporous silica coated ZSM-5 combined with Pt immobilization

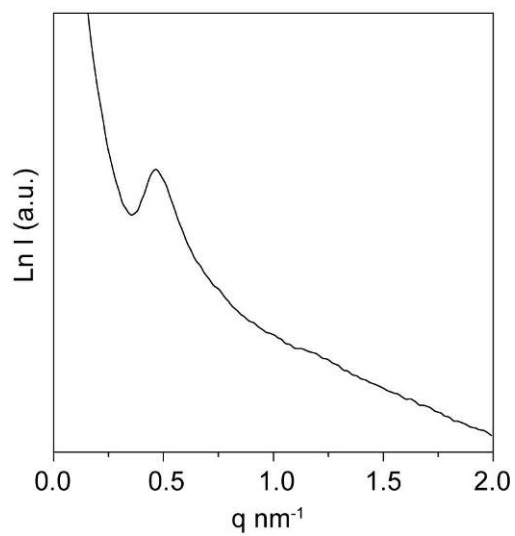
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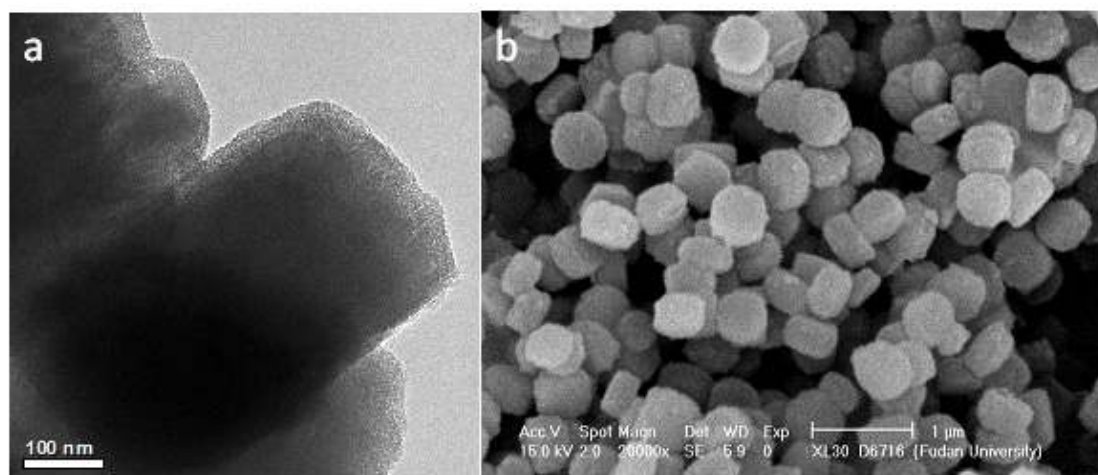
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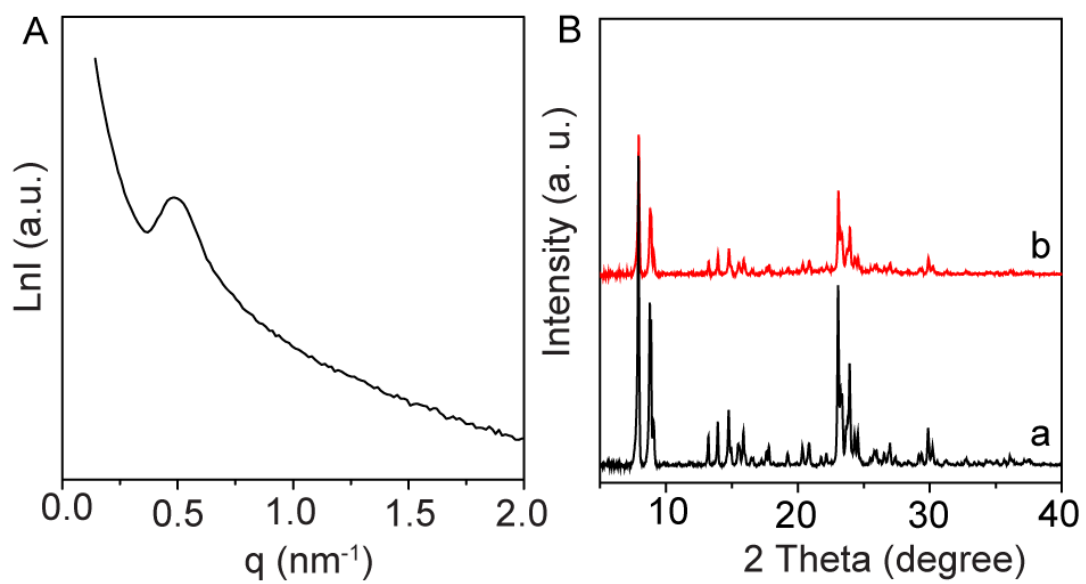
**Figure S1.** SEM images of the cage-like meso-/micro-porous core-shell composites  $\text{HZ}@C\text{mesoSiO}_2$  with a shell thickness of  $\sim 70$  nm prepared by using acid catalyzed sol-gel coating process and triblock copolymer F108 as a mesostructural template.



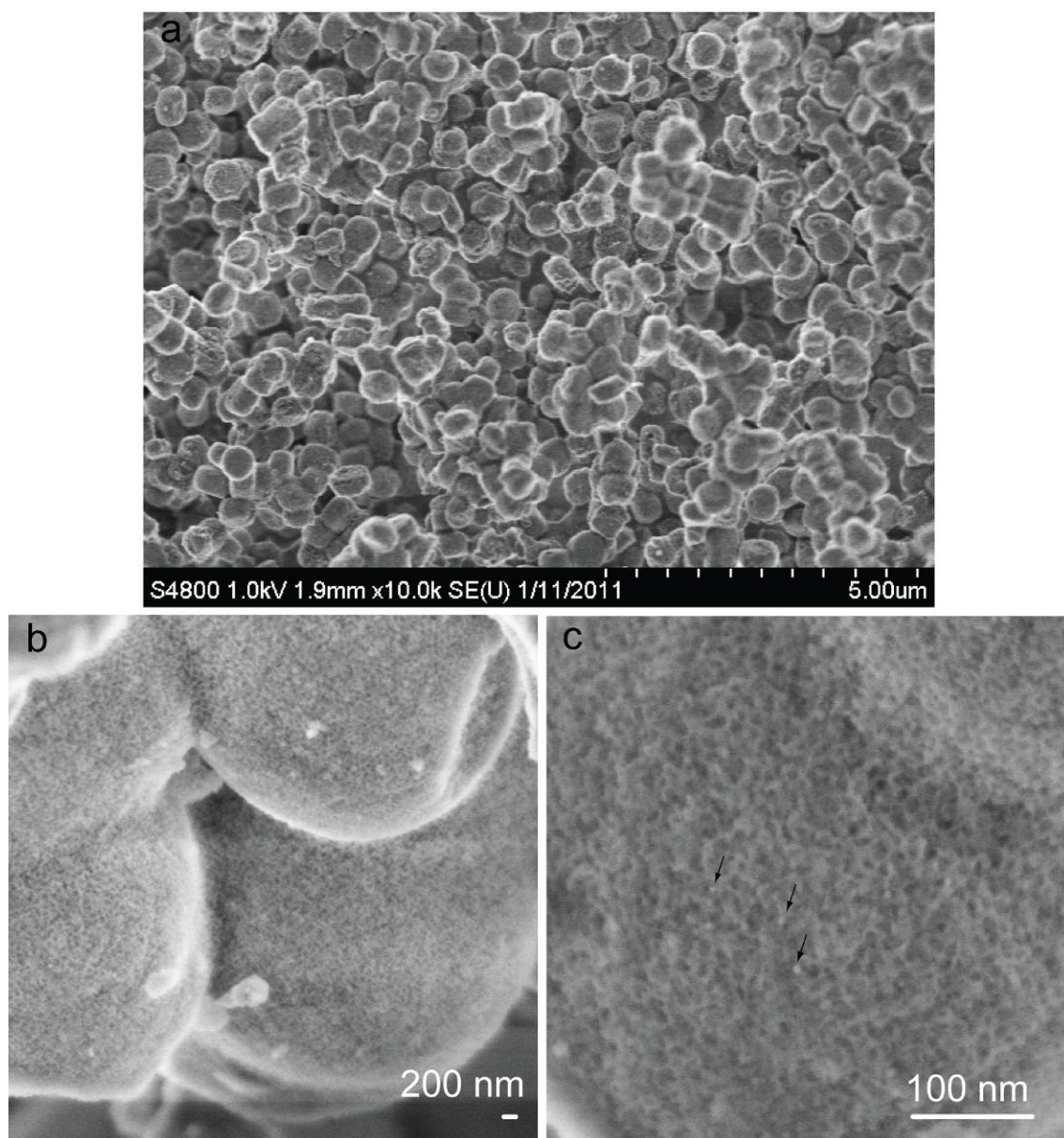
**Figure S2** The SAXS pattern of the core-shell composites HZ@CmesoSiO<sub>2</sub> with a shell thickness of ~ 70 nm.



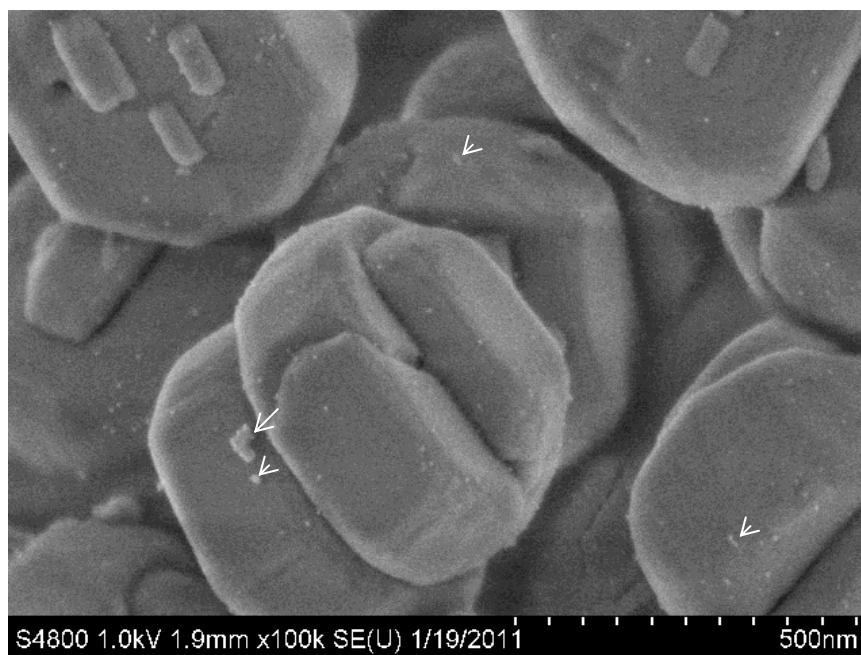
**Figure S3** TEM (a) and SEM (b) images of the core-shell composites HZ@CmesoSiO<sub>2</sub> with a shell-thickness of ~ 25 nm.



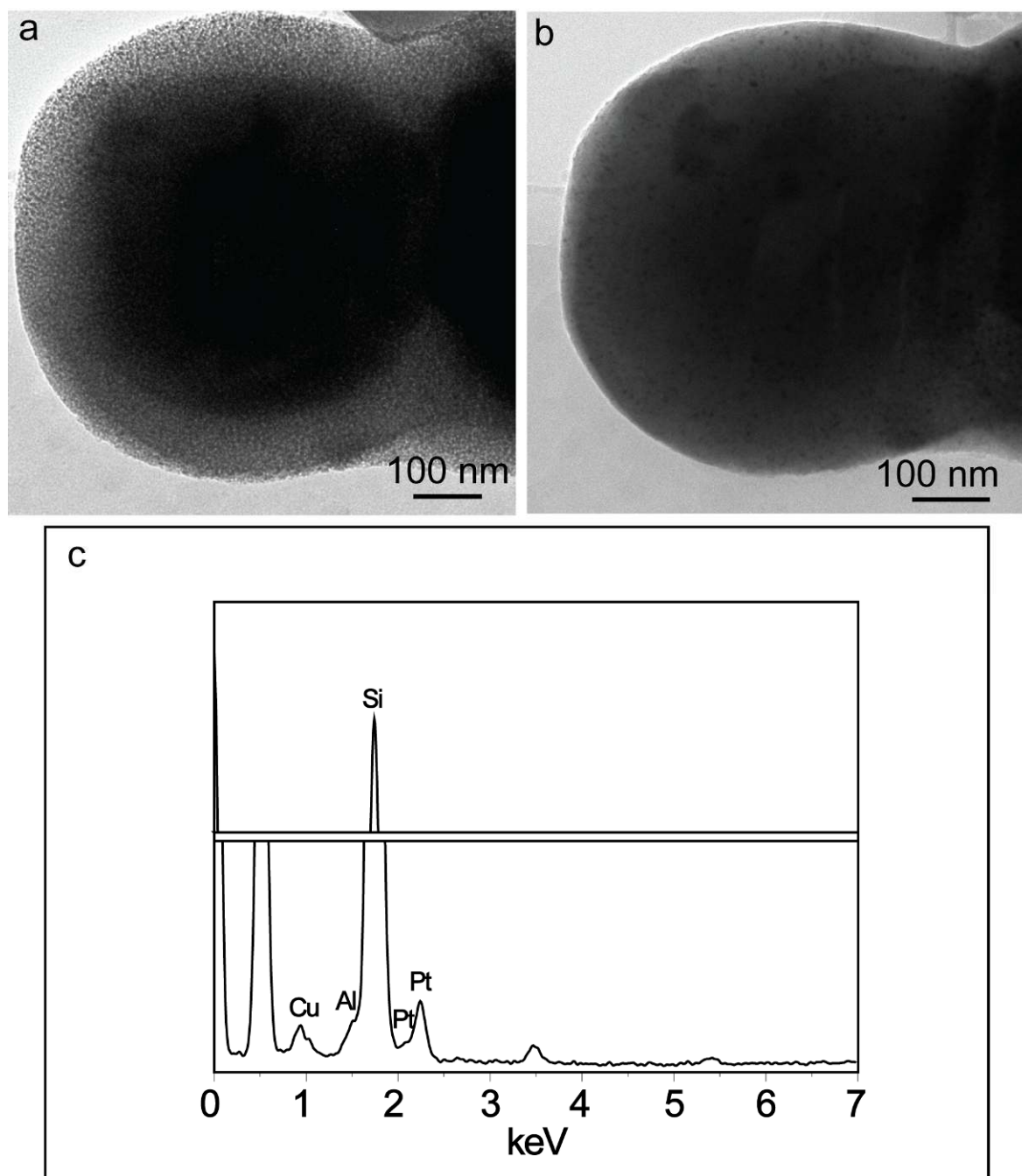
**Figure S4** The SAXS (A) of the Pt/HZ@CmesoSiO<sub>2</sub> composites and the wide-angle XRD patterns (B) of the pristine HZSM-5 (a) and Pt/HZ@CmesoSiO<sub>2</sub> composites (b).



**Figure S5** The FESEM images with different magnification for the Pt immobilized core-shell composite molecular sieve (Pt/HZ@CmesoSiO<sub>2</sub>) with cage-type mesopores, showing uniform core-shell particles and cage-like mesoporous silica shells covered on the zeolite crystals. The black arrows in the image (c) indicate the bright dots of the Pt nanoparticles.



**Figure S6** The FESEM image of the sample Pt/HZSM-5 prepared by a wet-impregnation method using  $[\text{Pt}(\text{NH}_3)_4\text{Cl}_2 \cdot x\text{H}_2\text{O}]$  as a platinum source, showing a plenty of Pt bright dots on smooth surface of zeolite particles. The white arrows point out some aggregated platinum particles.



**Figure S7** TEM images of a Pt-immobilized core-shell particle in Pt/HZ@CmesoSiO<sub>2</sub> composite taken at different times showing a large plenty of Pt nanoparticles well-dispersed in a cage-like mesoporous core-shell composite, showing that a core-shell particle has a little shrinkage under irradiation of electron beams. The corresponding EDX pattern is given in (c).