Electronic Supplementary Material (ESI) for Dalton Transactions.

One-Pot Synthesis of M (M= Ag, Au)@SiO_2 Yolk-Shell Structure via Organosilane-Assisted Method: Preparation, Formation Mechanism and Application in Heterogeneous Catalysis

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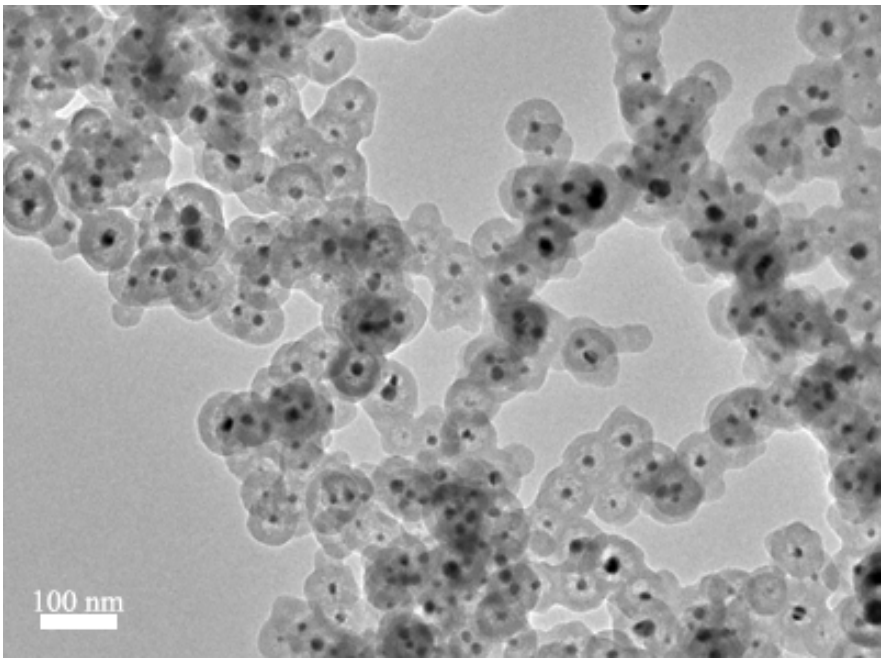

Figure S1. TEM image of Ag@SiO_2 nanorattles when replacing APTMS with APTES.

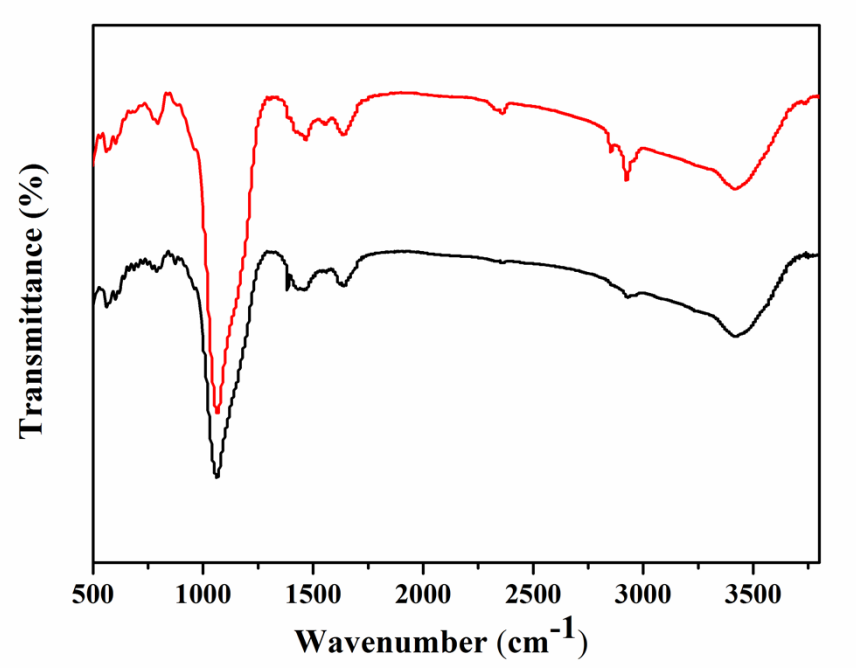

Figure S2. The FT-IR spectra of (a) as-made yolk-shell Ag@CTAB/SiO_2 without the treatment of ethanol/ammonium nitrate and Ag@mSiO_2 microspheres after the mild treatment of ethanol/ammonium nitrate. For the Ag@CTAB/SiO_2, the bands observed in the region 2800-3000 cm^{-1} are attributed to the vibrations of $–CH_2$ of CTAB templates. After removing CTAB, almost no adsorption peaks were observed in the range of 2800-3000 cm^{-1} for the Ag@mSiO_2.

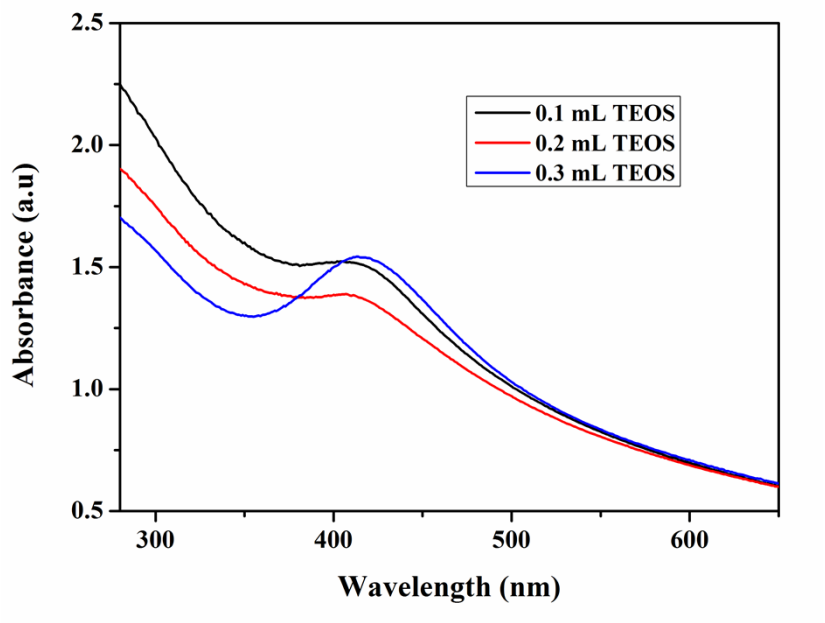

Figure S3. The optical properties of Ag@SiO_2 fabricated with different amount of F-TEOS.

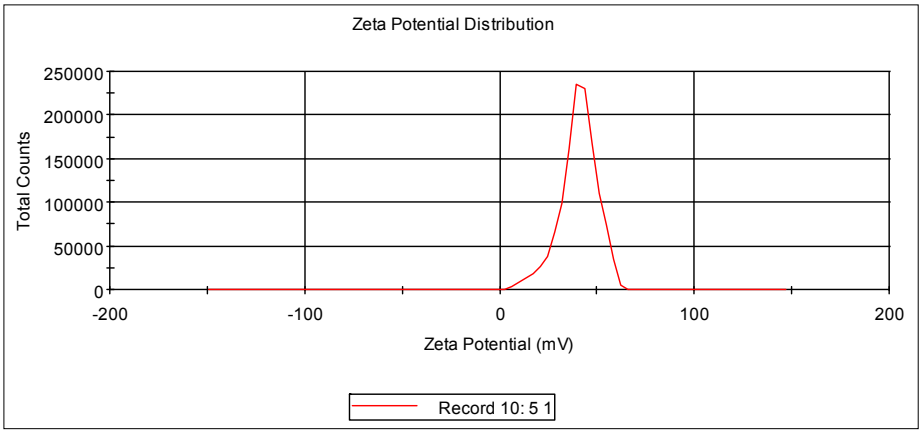

Figure S4. The as-synthesized nanorattles show a positive ζ potential.

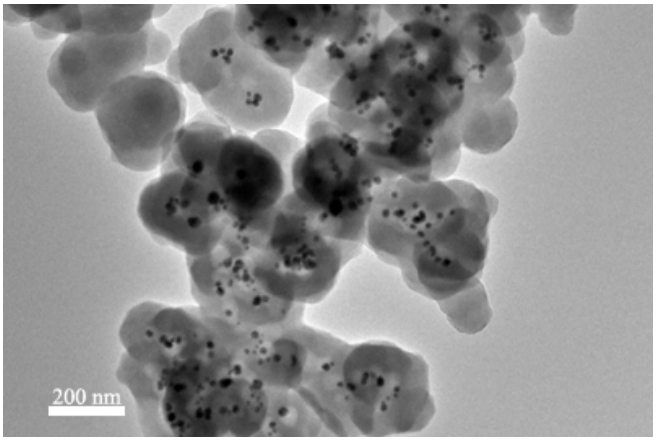

Figure S5. TEM image of the morphology of the as-synthesized nanocomposites when extending the gel time of F-TEOS to 12 hour.

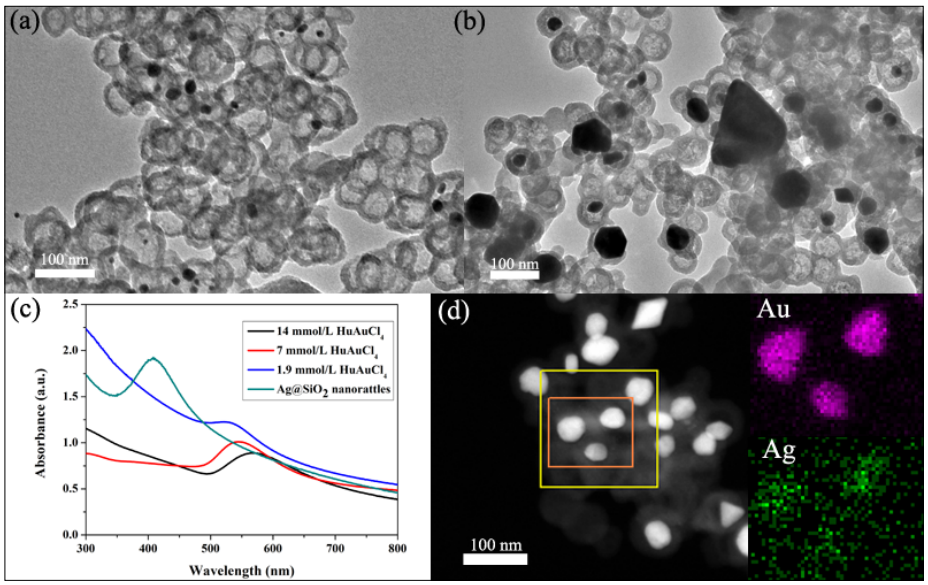

Figure S6. TEM image of $Ag@SiO_2$ nanorattles obtained by impregnating the as-synthesized $Ag@SiO_2$ nanorattles in different concentration of $HAuCl_4$ aqueous solution, (a) 1.9 mM, (b) 14 Mm and their corresponding UV-vis absorbance. (d) EDS elemental mapping of the as-made Au nanoparticles.