Electronic Supplementary Material (ESI) for RSC Advances

Palladium nanoparticles encapsulated in porous silica shells: an efficient and highly stable catalyst for CO oxidation

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Supplementary information

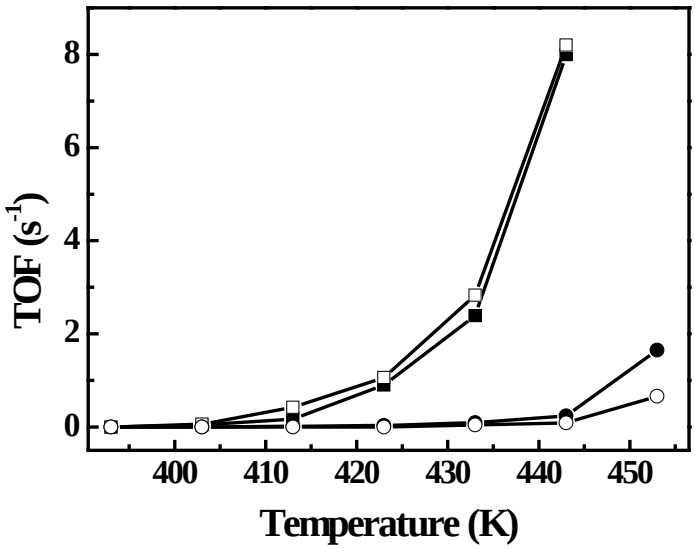

Fig. S1. TOF vaules of CO oxidation over different catalysts. (■) Pd@SiO_2-673, (□) Pd@SiO_2-873, (●) Pd/SiO_2-673, and (○) Pd/SiO_2-873. Reaction conditions: 1.0 vol.% CO and 20.0 vol.% O_2 balanced with N_2, atmospheric pressure.

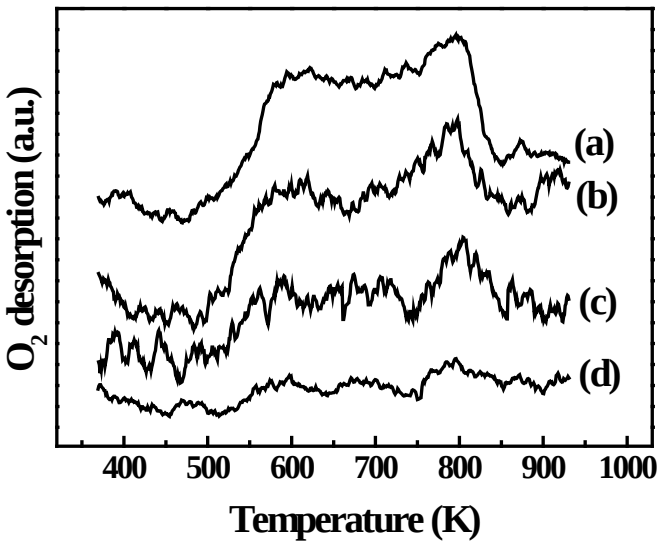

Fig. S2. O_2-TPD profiles of (a) Pd@SiO_2-673, (b) Pd@SiO_2-873, (c) Pd/SiO_2-673, and (d) Pd/SiO_2-873. The signal is normalized based on unit mass Pd

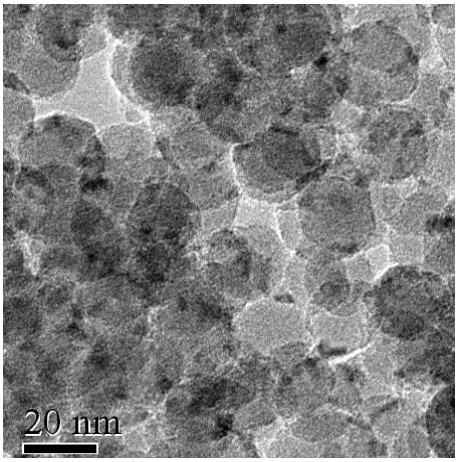

Fig. S3. TEM image of Pd@SiO_2-673-CeO_2. The sample was prepared by the following method. 1.0 g of Pd@SiO_2-673 was impregnated with $Ce(NO_3)_3 \cdot 6H_2O$ aqueous solution (0.2 mol/L). After being ultrasonication for 5 min, the impregnation was allowed to proceed for 12 h. After being dried at 373 K, the sample was calcinated at 673 K for 4 h, and then reduced in a 10% H_2/N_2 flow at 373 K for 4 h.

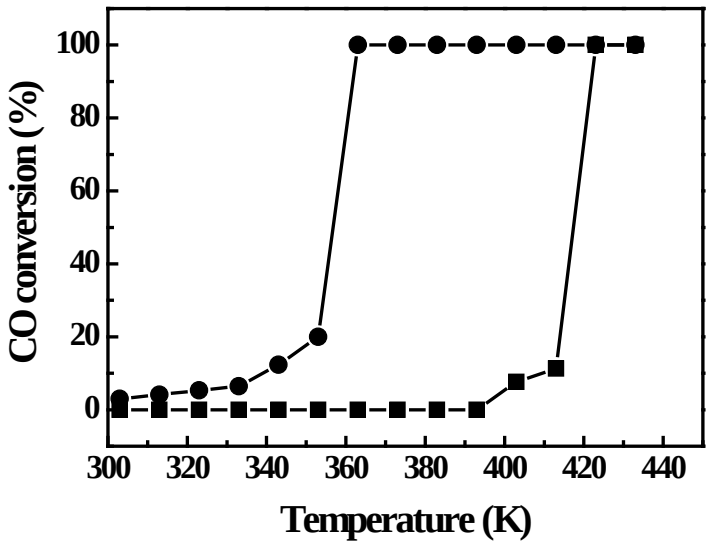

Fig. S4. Effect of the reaction temperature on CO conversions over Pd@SiO_2-673 (■) and Pd@SiO_2-673-CeO_2 (●). Reaction conditions: 1.0 vol.% CO and 20.0 vol.% O_2 balanced with N_2, atmospheric pressure, GHSV = 6000 L g_{pd}^{-1} h^{-1}.

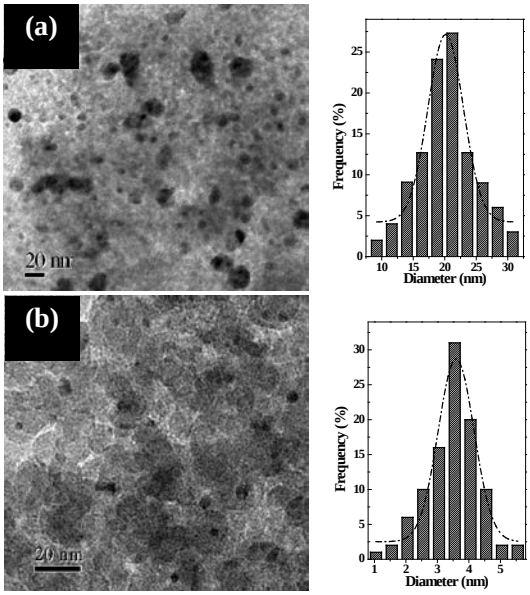

Fig. S5. TEM images (*left*) and the corresponding Pd size distribution histograms (*right*) of the used (a) Pd/SiO_2-673 and (b) Pd@SiO_2-673.