

**Fig. S1** FT-IR spectra of (a) SDS powder, and Sm<sup>3+</sup> doped CeO<sub>2</sub> powders (b) as-prepared precursor, and calcined at (c) 500°C, and (c) 650°C for 2 h.



Fig. S2 Hydrodynamic diameter of Sm<sup>3+</sup> doped CeO<sub>2</sub> powder calcined at 500°C for 2 h.