Electronic Supplementary Material (ESI) for Dalton Transactions

Supporting information for:

Preparation, Formation Mechanism and Photocatalysis of Ultrathin Mesoporous Single-Crystal-Like CeO_2 Nanosheets

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Figures

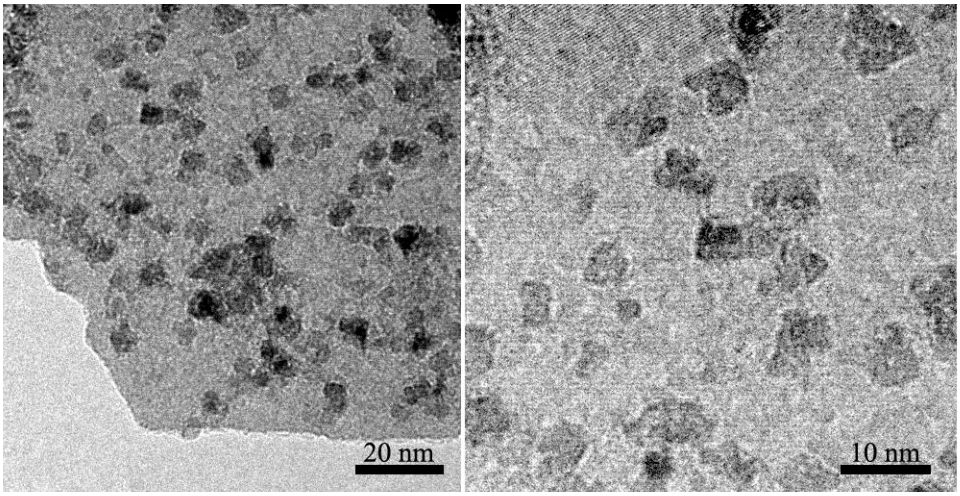

Fig. S1 TEM images of the obtained sample after hydrothermal treatment on 1D Ce-EDA nanorods at 280 ^{o}C for 12 h.

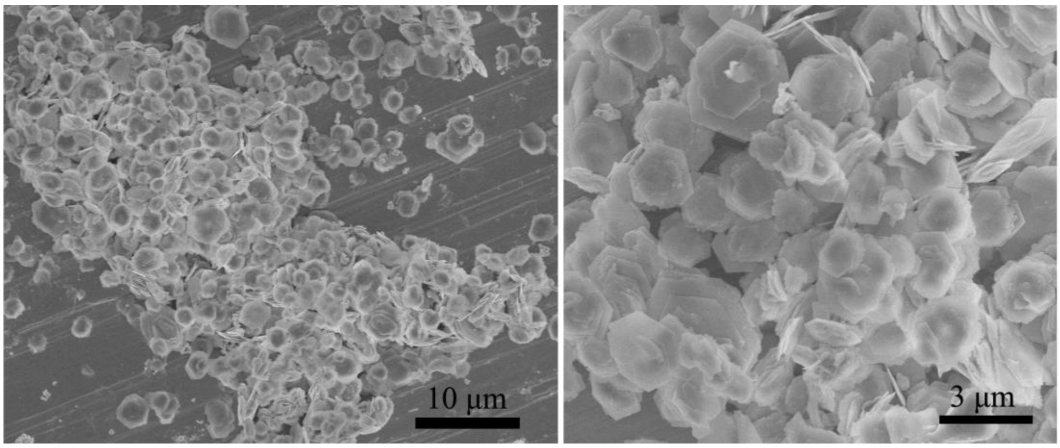

Fig. S2 Low-magnification SEM images of the $Ce(OH)CO_3$ nanosheets.

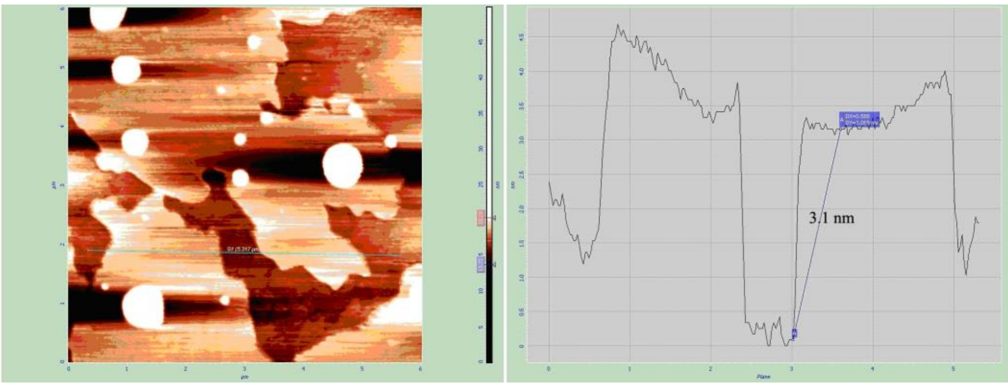

Fig. S3 Tapping-mode AFM and corresponding photograph of the monolayer $Ce(OH)CO_3$ nanosheets on a mica plate.

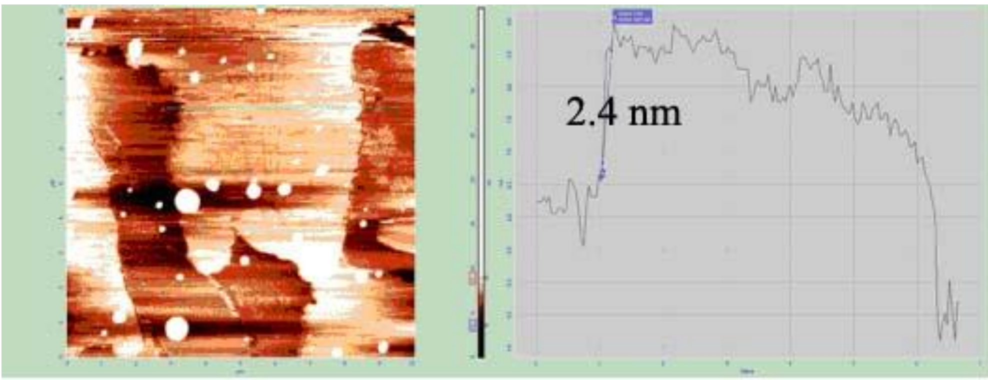

Fig. S4 Tapping-mode AFM and corresponding photograph of the monolayer CeO_2 nanosheets. Atomic force microscope (AFM) image of the CeO_2 nanosheets shows that their height is ~2.4 nm. It can be concluded that monolayer CeO_2 nanosheets are derived from the thermal decomposition of single-layered $Ce(OH)CO_3$.

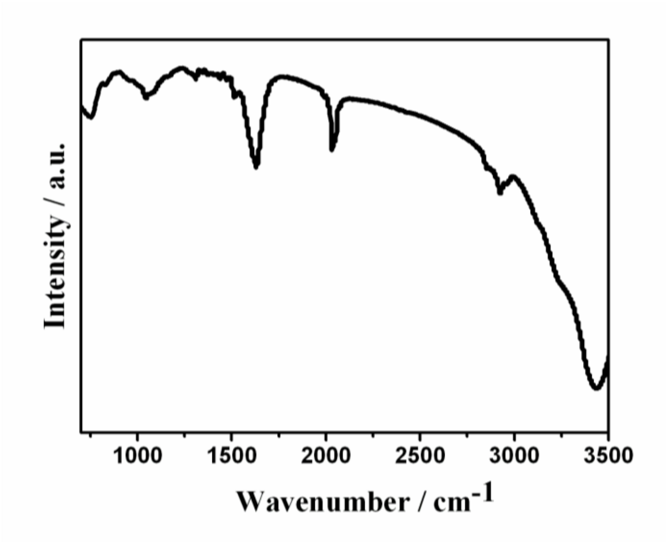

Fig. S5 FT-IR spectrum of the sample prepared after hydrothermal treatment on 1D Ce-EDA nanorods for 6 h. The sample was collected and washed with water for 6 times.

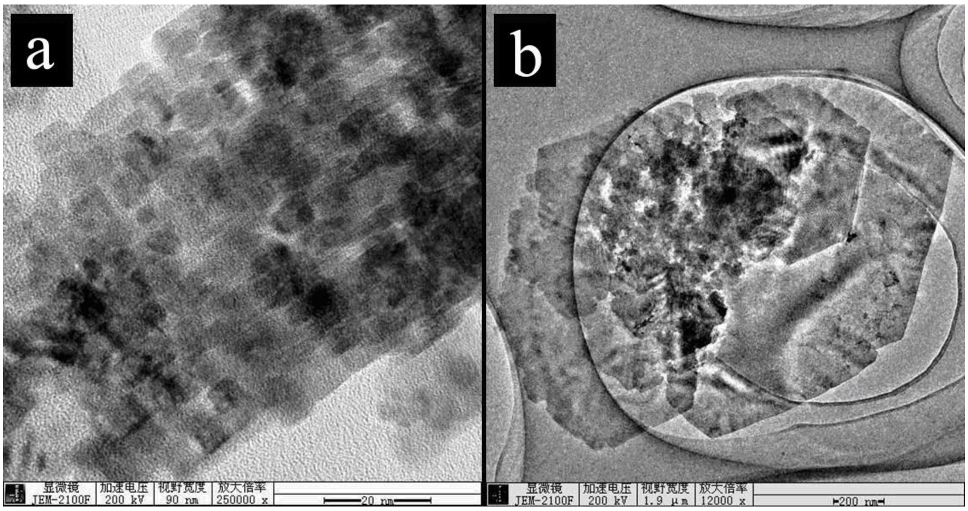

Fig. S6 TEM images of the sample obtained in the same conditions as those for $Ce(OH)CO_3$ nanosheets except the difference in hydrothermal temperature: (a) 200 ^oC, (b) 240 ^oC.

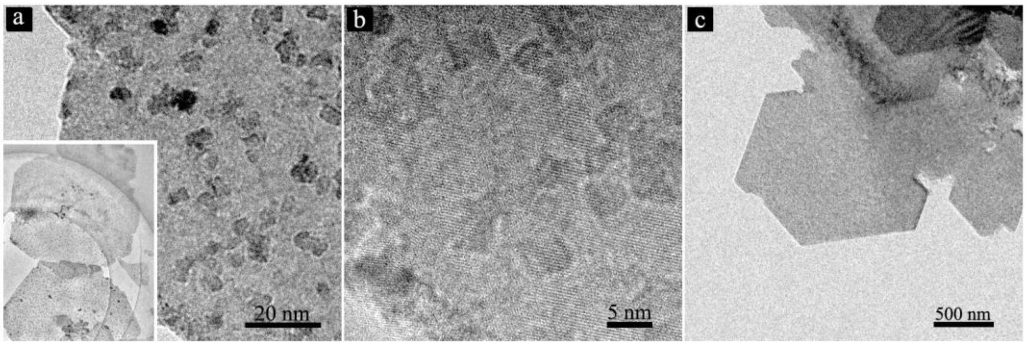

Fig. S7 The TEM images of evolution from coarse surface to smooth nanosheets (a to c).

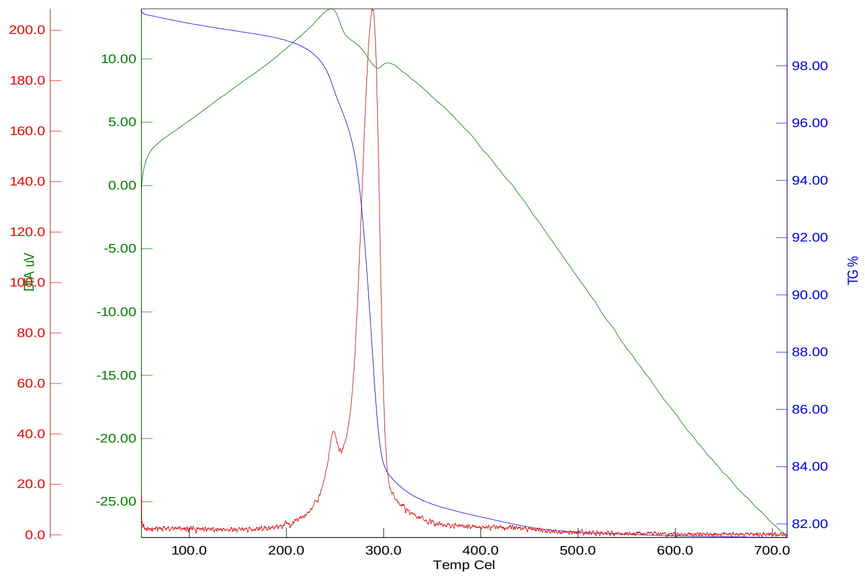

Fig. S8 The thermogravimetric analysis curve of as-obtained $Ce(OH)CO_3$ nanosheets.

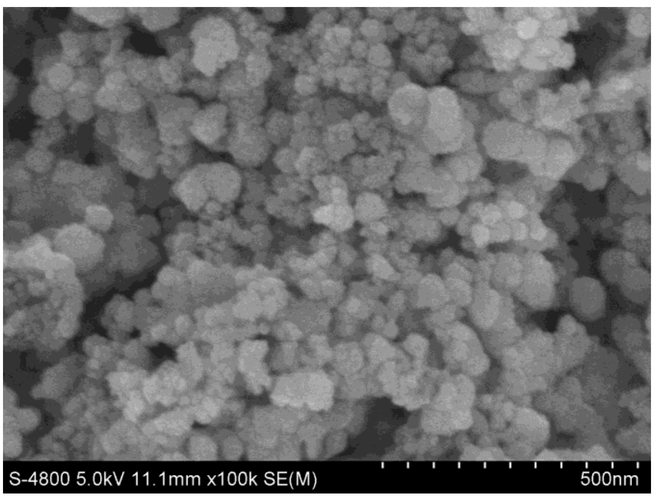

Fig. S9 SEM image of CeO_2 nanoparticles prepared by sol-gel method.

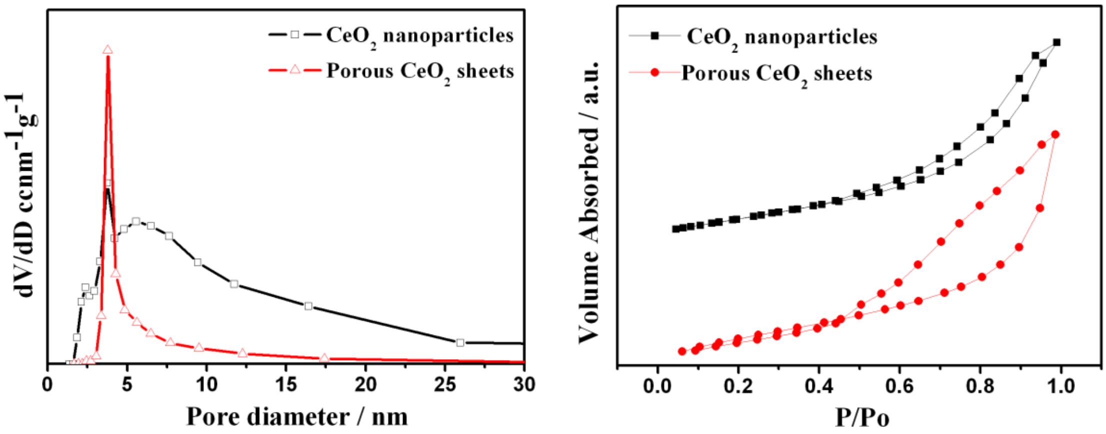

Fig. S10. Mesopore size distributions (a) and nitrogen adsorption/desorption isotherms (b) of the CeO_2 nanoparticles and porous CeO_2 nanosheets, suggesting the existence of mesopores in both CeO_2 catalysts. The porous CeO_2 nanosheets possess narrower pore-size distribution with an average pore size of 3.7 nm, which is lower than that of CeO_2 nanoparticles (4.2 nm). The specific surface areas of CeO_2 catalysts in porous sheets and particles are 66 m^2/g and 60 m^2/g, respectively.