Electronic Supplementary Information

Core-Shell Structured CeO_2@MoS_2 Nanocomposites for High Performance Symmetric Supercapacitor

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Chemicals. Cerium (Ⅲ) nitrate hexahydrate ($Ce(NO_3)_3{\cdot}6H_2O$, 99.99 %, Sigma-Aldrich), tetraethylorthosilcate ($Si(OC_2H_5)_4$, 98 %, Acros Organics), sodium molybdate ($Na_2MoO_4{\cdot}2H_2O$, 99 %, Fluka), thioacetamide (CH_3CSNH_2, 98 %, Sigma-Aldrich), 1-ethyl-3-methylimidazolium tetrafluoroborate (Emim(BF_4), $C_6H_{11}BF_4N_2$, 98%, Energy Chemical), sodium sulfate (Na_2SO_4, 99%, Energy Chemical). Ammonium hydroxide ($NH_3{\cdot}H_2O$, 25 %), absolute ethanol (C_2H_6O, 99.7 %), sodium hydroxide (NaOH, 96 %) and ethylene glycol ($C_2H_6O_2$) were purchased from Tianjin Zhiyuan Chemical Company. All chemicals were used without any further purification. Deionized water was used throughout this study.

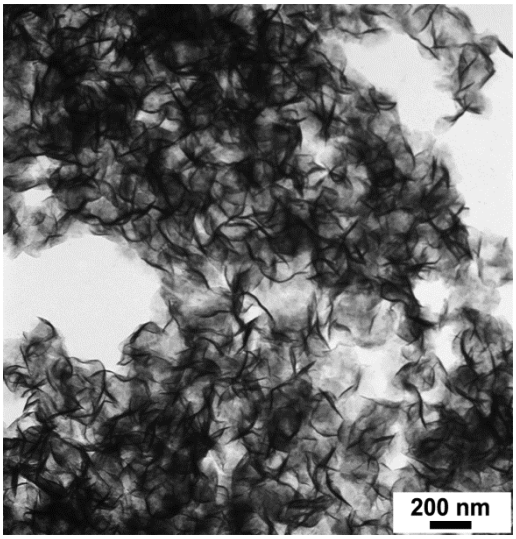

Figure S1. TEM image of pure MoS_2 nanosheets.

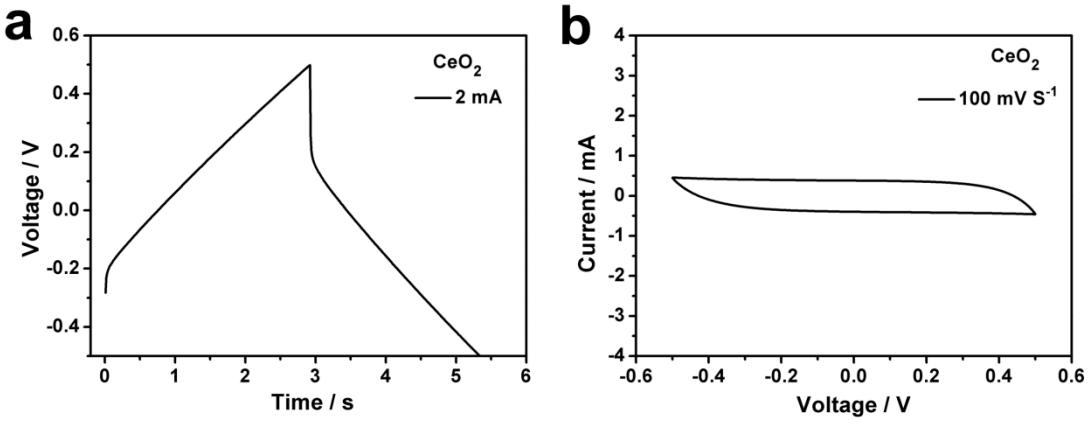

Figure S2. The electrochemical performance of CeO_2 porous hollow spheres in a two-electrode cell with aqueous electrolyte (1M Na_2SO_4). (a) The galvanostatic charge-discharge profiles of CeO_2 hollow spheres at the applied current of 2 mA (The active electrodes area was ca. 0.785 cm^2). (b) Cyclic voltammetry plots of CeO_2 hollow spheres at the scan rate of 100 mV s^{-1}.

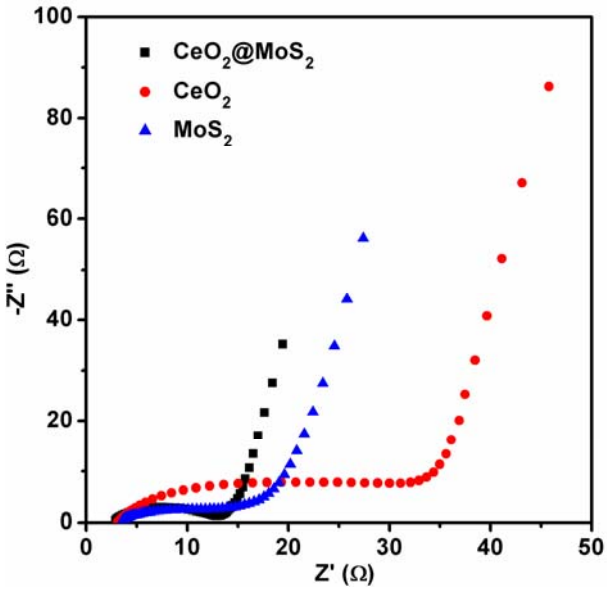

Figure S3. EIS Nyquist plots of CeO_2@MoS_2 nanocomposites, CeO_2 hollow spheres and MoS_2 nanosheets with aqueous electrolyte (1M Na_2SO_4). We used AUTOLAB electrochemistry workstation to test the impedance of CeO_2@MoS_2 nanocomposites, CeO_2 hollow spheres and MoS_2 nanosheets. As shown in **Figure S3,** Nyquist plots revealed the charge-transfer resistance (R_{ct}) for CeO_2@MoS_2 nanocomposites was the smallest compared with pure MoS_2 nanosheets and CeO_2 hollow spheres, indicating a smaller reaction resistance and hence a better performance for supercapacitor with aqueous electrolyte (1M Na_2SO_4) for CeO_2@MoS_2 nanocomposites.