Electronic Supplementary Information

3D walnut-shaped TiO_2/RGO/MoO_2@Mo electrode exhibiting extraordinary supercapacitor performance

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Assembly of asymmetric supercapacitor (ASC) devices

The asymmetric supercapacitor (ASC) devices were fabricated by employing as-prepared TiO_2/RGO/MoO_2@Mo and commercial active carbon (YEC-8A Fuzhou Yihuan Carbon Company) in a two-electrode configuration.

More precisely, as-obtained TiO_2/RGO/MoO_2@Mo was directly used as negative electrode. The positive electrode was fabricated by mixing active carbon (12 mg), acetylene black (1.5 mg) and PVDF (1.5 mg) at a mass ratio of 8:1:1 to obtain slurry and then coating the slurry onto carbon cloth substrate (1×1 cm^2). Lastly, the positive electrode was dried at 60ºC for 12 h in a vacuum oven.

The weights of active materials of electrodes were 12 mg (positive electrode) and 2.4 mg (negative electrode), respectively. The assembled ASCs devices were tested in 1 M H_2SO_4 electrolyte with a two-electrode system at room temperature about 15ºC.

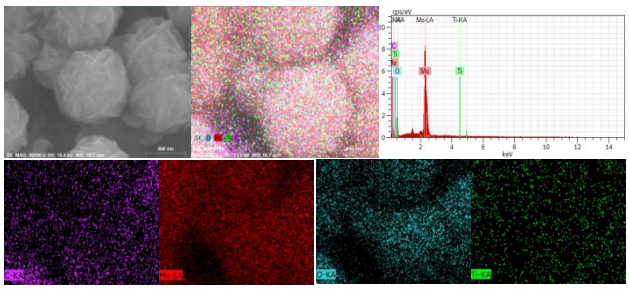

Fig. S1 EDS mapping of TiO_2/RGO/MoO_2 composites.

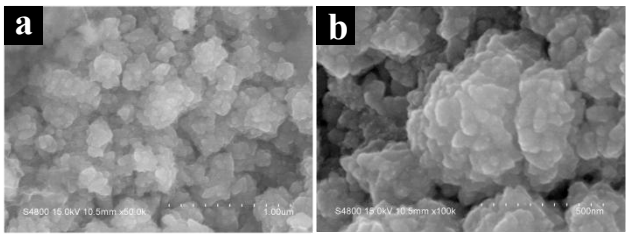

Fig. S2 FESEM images of TiO_2/RGO/MoO_2 composites after 5000 cycles: (a) 50 k and (b) 100 k.

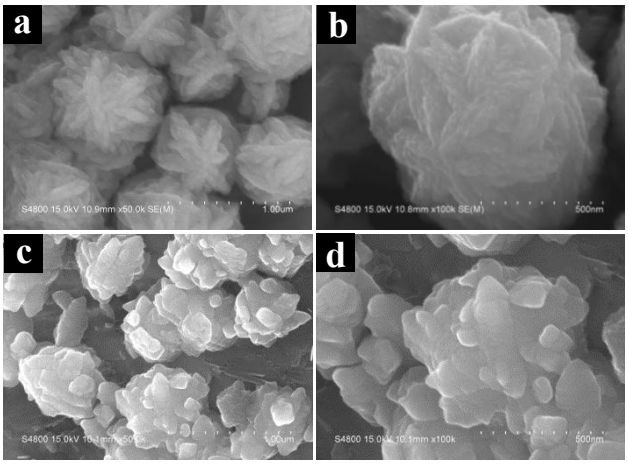

Fig. S3 FESEM images of TiO_2/RGO/MoO_2 composites: (a, b) before and (c, d) after calcination, (a, c) 50 k and (b, d) 100 k.

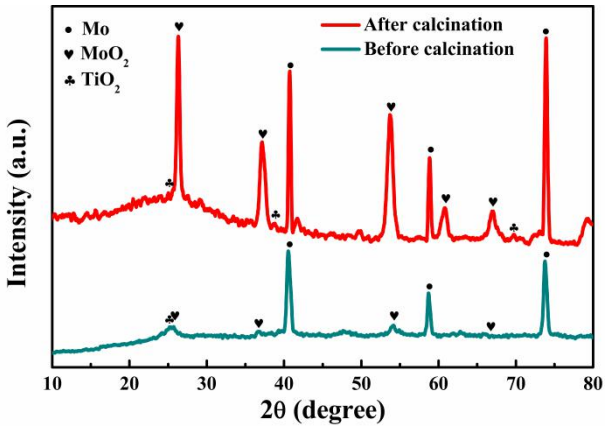

Fig. S4 XRD patterns of TiO_2/RGO/MoO_2 composites before and after calcination at 450ºC.

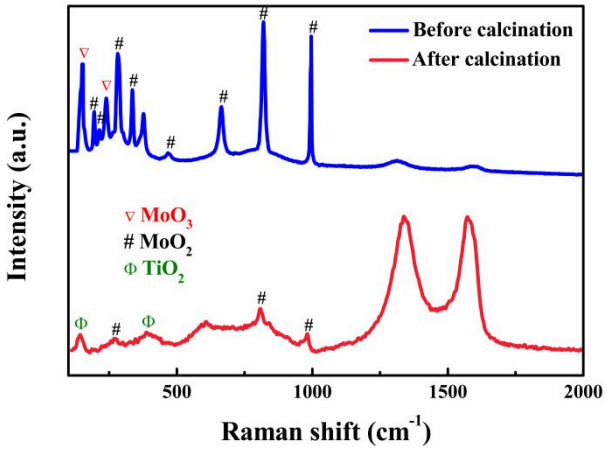

Fig. S5 Raman spectra of TiO_2/RGO/MoO_2 composites before and after calcination at 450ºC.

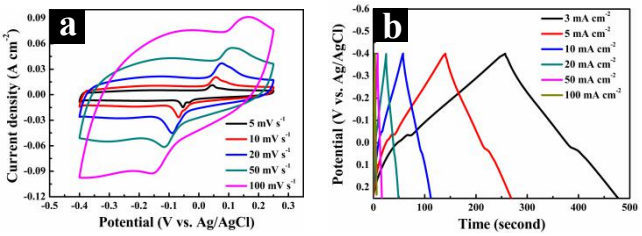

Fig. S6 (a) CV curves at different scan rates and (b) GCD results at various current densities for TiO_2/RGO/MoO_2@Mo electrode after calcination at 450ºC in N_2 atmosphere.

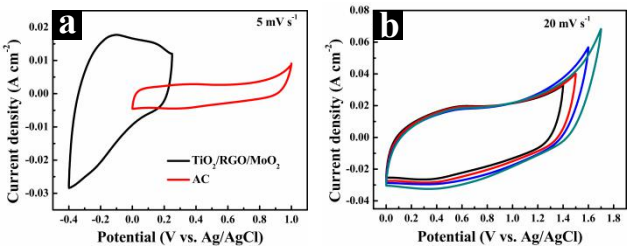

Fig. S7 (a) CV curve of AC and TiO_2/RGO/MoO_2@Mo electrodes at 5 mV s^{-1} in three-electrode system. (b) CV curves of TiO_2/RGO/MoO_2@Mo//AC asymmetry supercapacitors devices collected in different cell voltage windows at 20 mV s^{-1}.

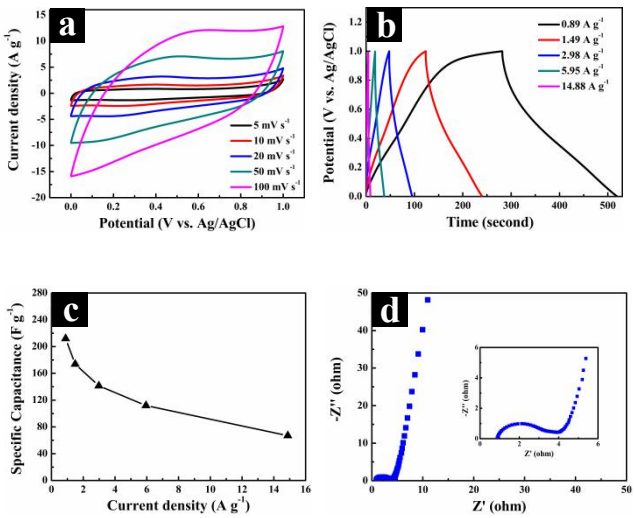

Fig. S8 Electrochemical performances of active carbon as the positive electrode.

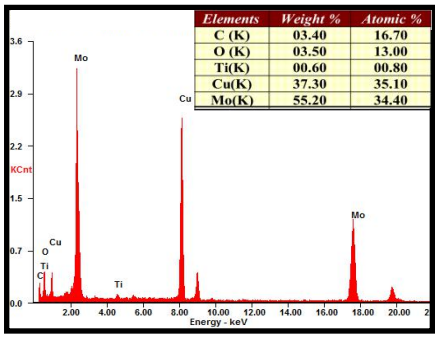

Fig. S9 EDS in TEM of TiO_2/RGO/MoO_2 composites.