Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information (SI)

α -MoO_3 nanoparticles: Solution combustion synthesis, photocatalytic and electrochemical properties

G. P. Nagabhushana[a], D. Samrat[b] and G. T. Chandrappa[a]*
[a]Department of Chemistry, Bangalore University, Bangalore-560001, India
[b]Center for Nano and Material Sciences, Jain University, Jakkasandra-562112, India.

Electrochemical studies have been extended to M2 and commercial MoO_3 for the comparison purpose with the same experimental conditions under which experiments were conducted for M1.

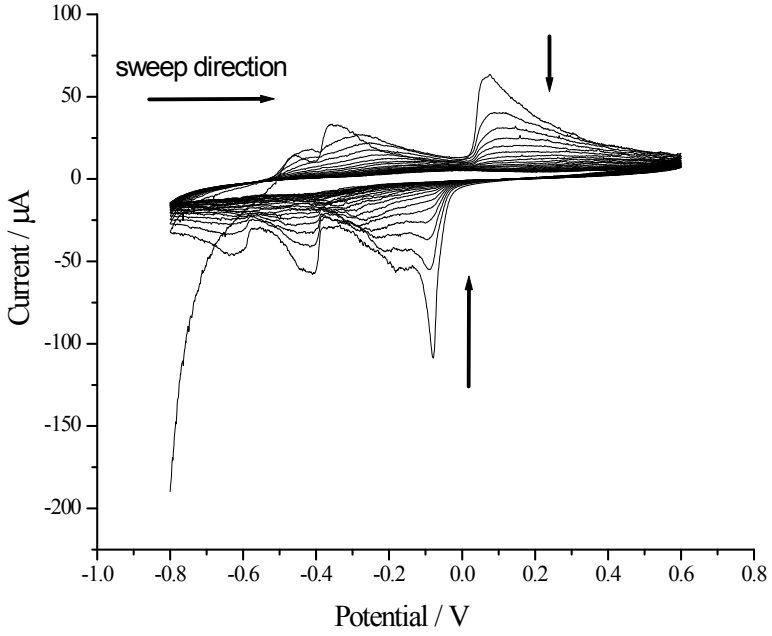

Figure S1. Continuous cyclic voltammograms (25 cycles) of M2 drop casted GCE in 0.5 M H_2SO_4 with a scan rate 30 mVs^{-1}

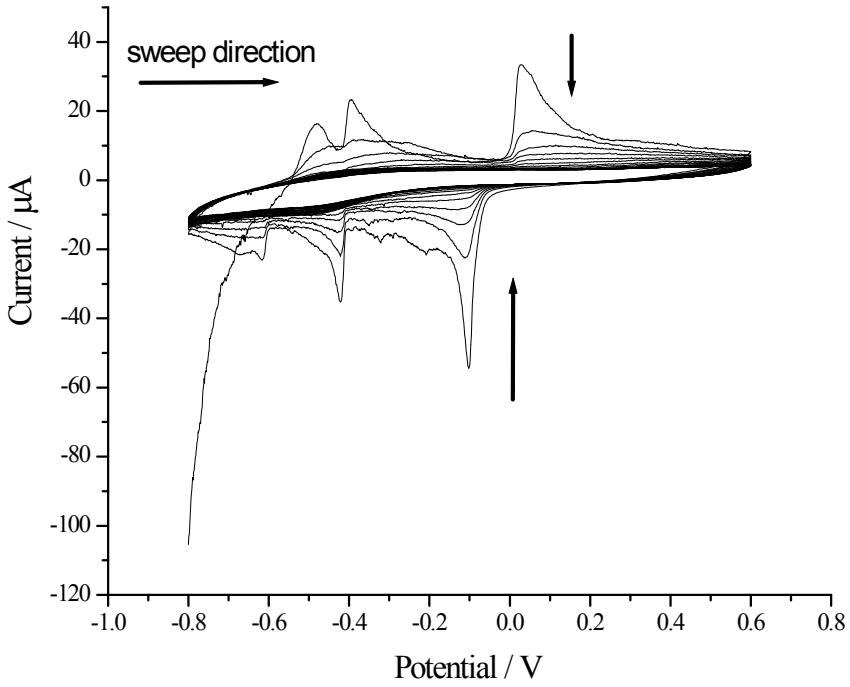

Figure S2. Continuous cyclic voltammograms (25 cycles) of commercial MoO_3 drop casted GCE in 0.5 M H_2SO_4 with a scan rate 30 mVs^{-1}

Continues cyclic voltammograms were recorded for M2 and commercial MoO_3 drop casted GCE as shown in Figure S1 and S2. In case of M2 and commercial MoO_3 three pair of redox peaks were observed in the cyclic voltammograms as similar to that of M1. But the current of anodic and cathodic peaks were diminished considerably just after the 5^{th} cycle in both the cases. This can be explained due to the less deintercalation of H^+ ions from M2 and commercial MoO_3. This in turn explains the lesser porosity of M2 and commercial MoO_3.

Electrochromic property of both M2 and commercial MoO_3

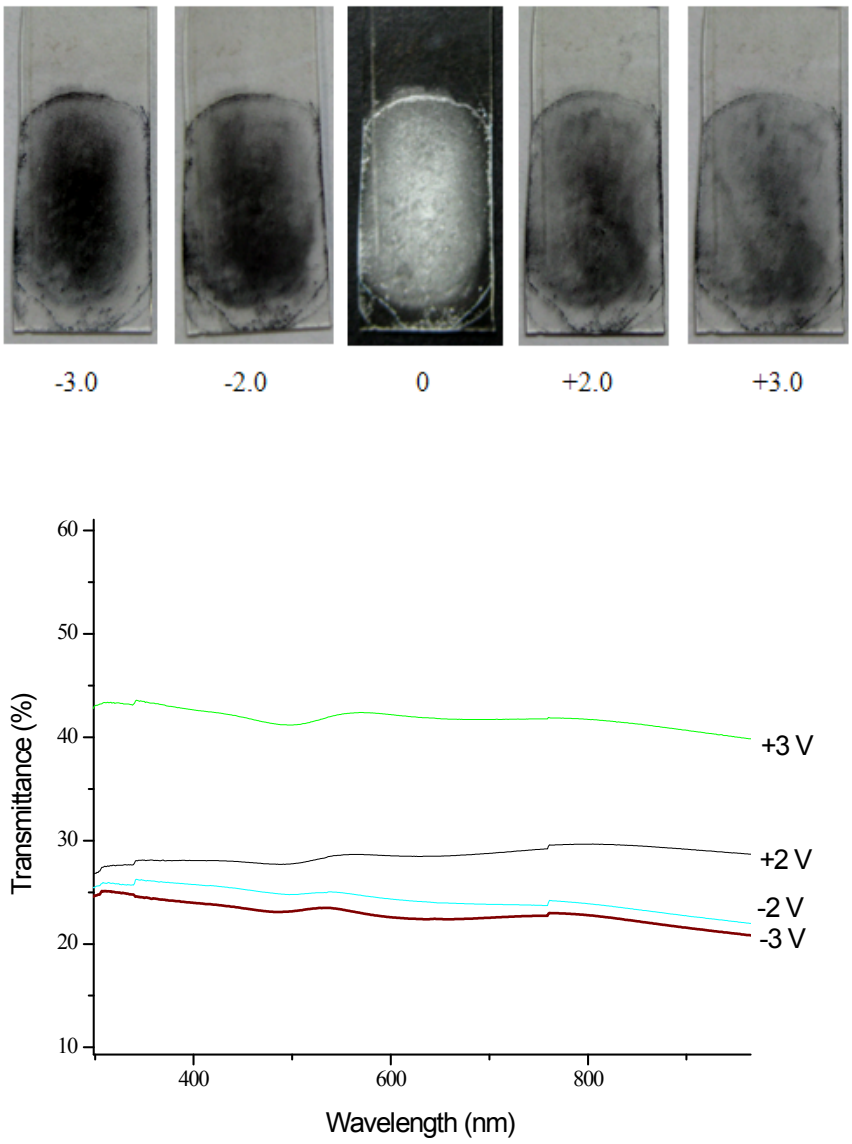

Figure S3. Optical photos of M2 casted ITO coated glass after applying the different polarization potentials in a chronological order -3, -2, 0, +2, +3 V for 120 s. Below are the corresponding UV-Vis spectra of the M2 coated ITO glass.

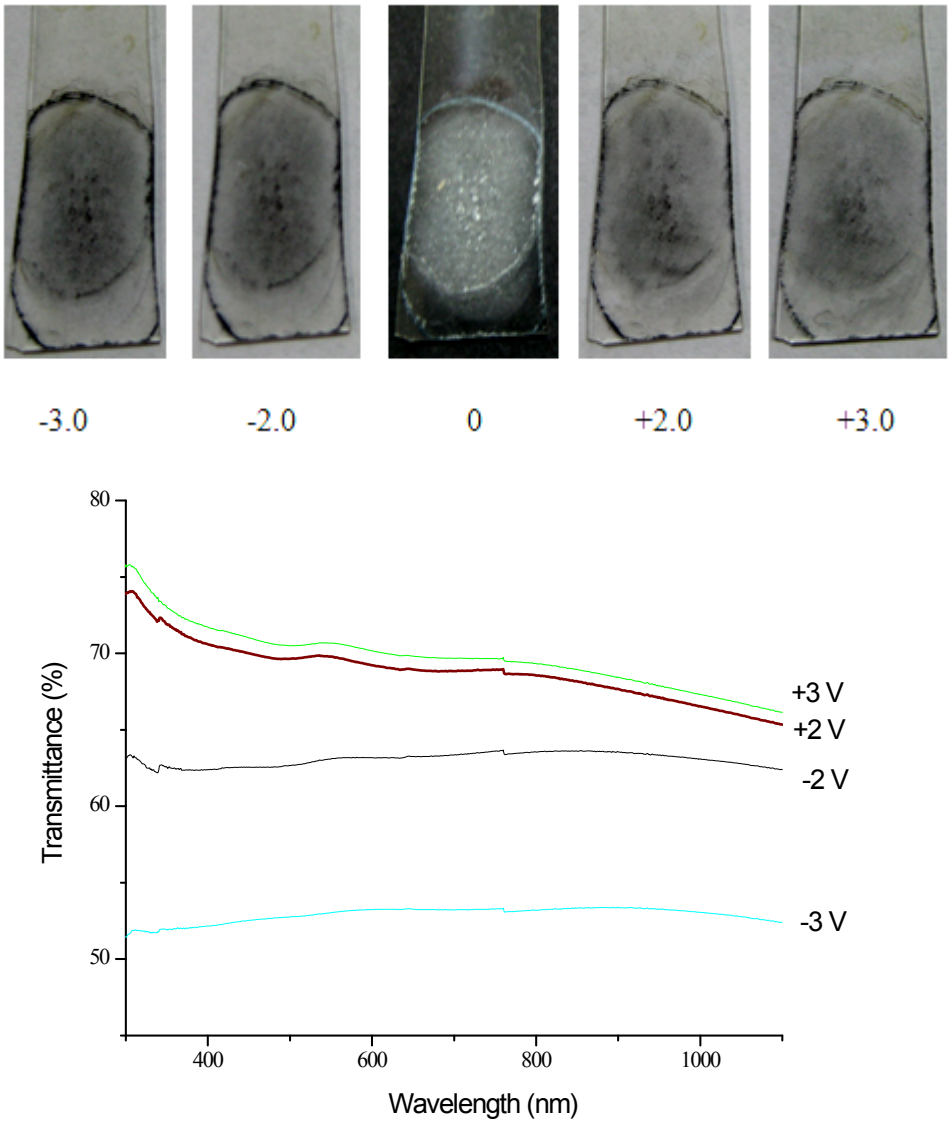

Figure S4. Optical photos of commercial MoO_3 casted ITO coated glass after applying the different polarization potentials in a chronological order -3, -2, 0, +2, +3 V for 120 s. Below are the corresponding UV-Vis spectra of the commercial MoO_3 coated ITO glass.

Electrochromic property of both M2 and commercial MoO_3 has been studied and the results are shown in Figure S3 and S4. Since M2 and commercial MoO_3 also forms the molybdenum bronze like M1 due to the intercalation of H^+ ions on applying the potentials such as -2.0 and -3.0 V. But the colour intensity of M1 > M2 > commercial MoO_3 at the same applied potentials. This indicates the greater percentage of insertion of H^+ into MoO_3 in case of M1. Similarly less bleaching of colour in case of M2 and commercial MoO_3 has been observed compared to M1. This can be explained due to incomplete deintercalation of inserted H^+ ions due to less porosity.

TEM images of MoO_3 M2 sample

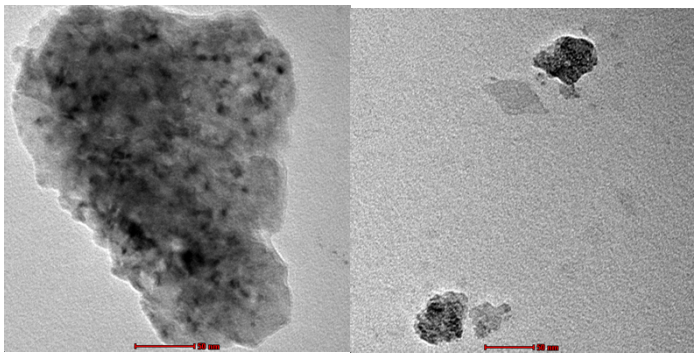

Figure S5: The TEM image for MoO_3 particles obtained using ammonium heptamolybdate pentahydrate, the size of the particles are in the range of 50-100 nm.