Electronic Supplementary Information

Effects of morphology, size and crystallinity on the electrochromic properties of nanostructured WO_3 films

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Fig. S1 shows Nyquist plots of WO_3 thin films with different morphologies and crystallinity. The EIS tests are carried out by applying an AC voltage of 10 mV in the frequency range of 100 kHz to 0.1 Hz at their bleached state[1]. A Randles circuit model is used to fit data presented in the inset of Fig. S1 at the lower right. The Randles circuit model comprises of series resistance (R_s) of the system (resulting from electrolyte/substrate resistance), the charge transfer resistance (R_{ct}, i.e. interfacial redox reaction resistance) connected in parallel with an electrical double layer capacitance (C_{dl}) at the electrolyte/electrode interface and finally the Warburg diffusion element (Z_w) accounting from the ionic diffusion and charging of film[2,3]. The porous WO_3 nanofiber, WNRs-1 and annealed WNRs-1 reveal low magnitude of R_{ct} (244, 421, 211Ω, respectively) than that of the WO_3 nanoflake arrays (2099 Ω) and WNRs-2 (1693 Ω), further confirming the fast charge transfer and Li^+ ion diffusion resulting in fast switching kinetics, which are in corresponding the optical modulation in Fig. 4.

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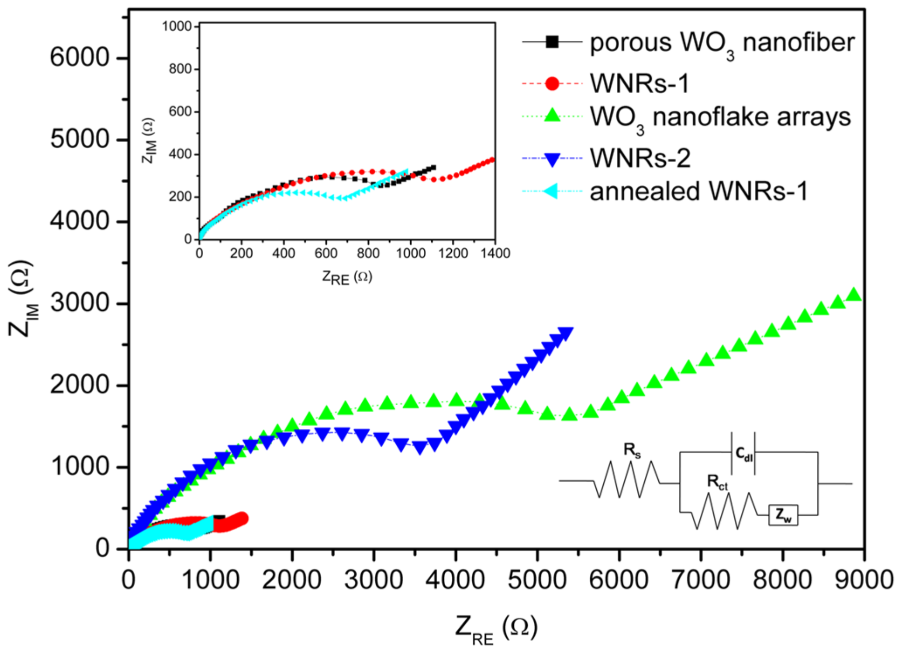

Fig. S1 EIS spectra of the as-prepared nanostructured WO_3 thin films.

References

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