Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Active and Passive Modulation of Solar Light Transmittance in a Hybrid Thermochromic Soft-Matter System for Energy-Saving Smart Windows Applications

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Abbreviations List

solar modulation ---- ΔT_{sol}

chiral nematic ---- N*

modulation contrast ---- MC

phase transition ---- PT

luminous transmission ----T_{lum}

polymeric acrylate liquid crystals ---- PALCs

transmission electron microscope ----TEM

X-ray photoelectron spectroscopy ---- XPS

energy-dispersive X-ray ---- EDX

polyethylene glycol diacrylate ---- PEGDA-600

hydroxypropyl methacrylate ---- HPMA

sematic A ---- SmA

tungsten doped vanadium dioxide ---- W-VO_2

liquid crystals ---- LCs

homeotropically aligned fibres ---- HAFs

Isotropic polymeric acrylate monomers ---- IPAMs

liquid crystals with a phase change behaviour ----PC-LCs

X-ray diffraction ---- XRD

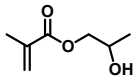
scanning electron microscopy ---- SEM

polarized optical microscope ---- POM

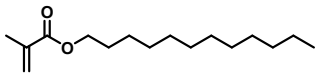
lauryl methacrylate ---- LMA

polyvinyl pyrrolidone ---- PVP

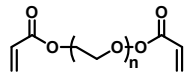
(1) Isotropic Polymeric Acrylate Monomers (IPAMs):



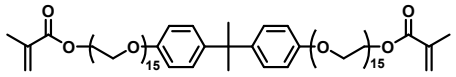
HPMA



LMA

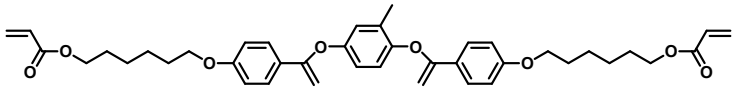


PEGDA600



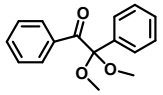
Bis-EMA15

(2) Polymeric Acrylate Liquid Crystals (PALCs):



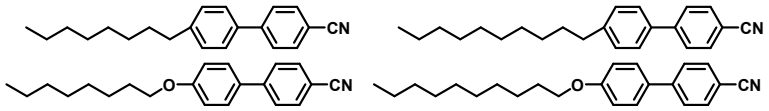
C6M

(3) Photo-initiator:

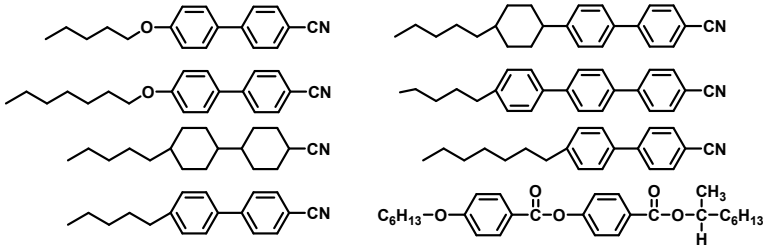


651

(4) Compositon of the SmA-LCs Monomers:



(5) Compositon of the N*-LCs Monomers:



(6) Compositon of the PC-LCs:

SmA-LCs : N*-LCs = 23 : 77 wt.%

Scheme S1. Chemicals structures and physical parameters of some of the materials used.

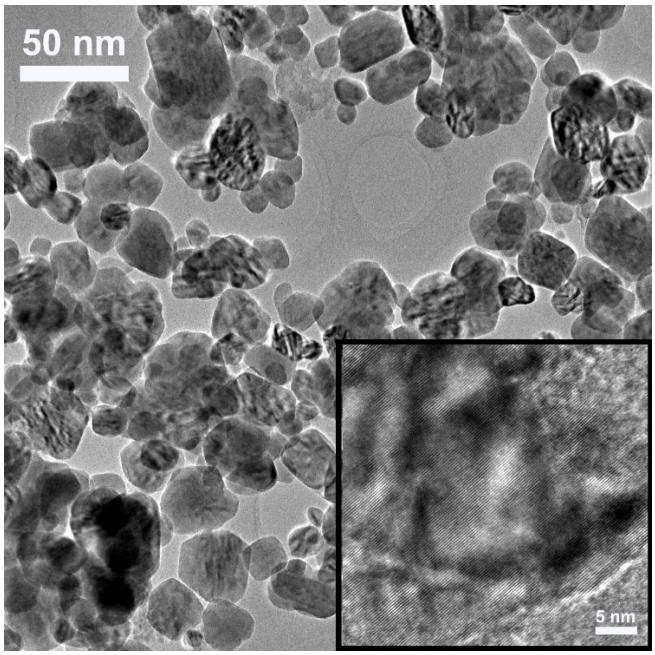


Figure S1. TEM photographs of the as-made W-VO_2 NCs synthesized from a thermolysis method (Insert image: HRTEM of the as made W-VO_2 NCs).

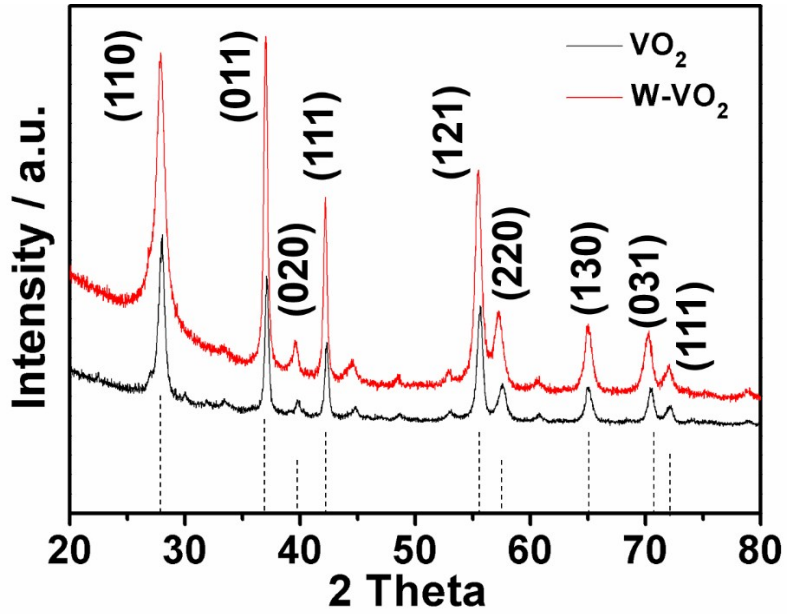


Figure S2. XRD pattern of the as-made VO_2 NCs (black) and W-VO_2 NCs (red), respectively.

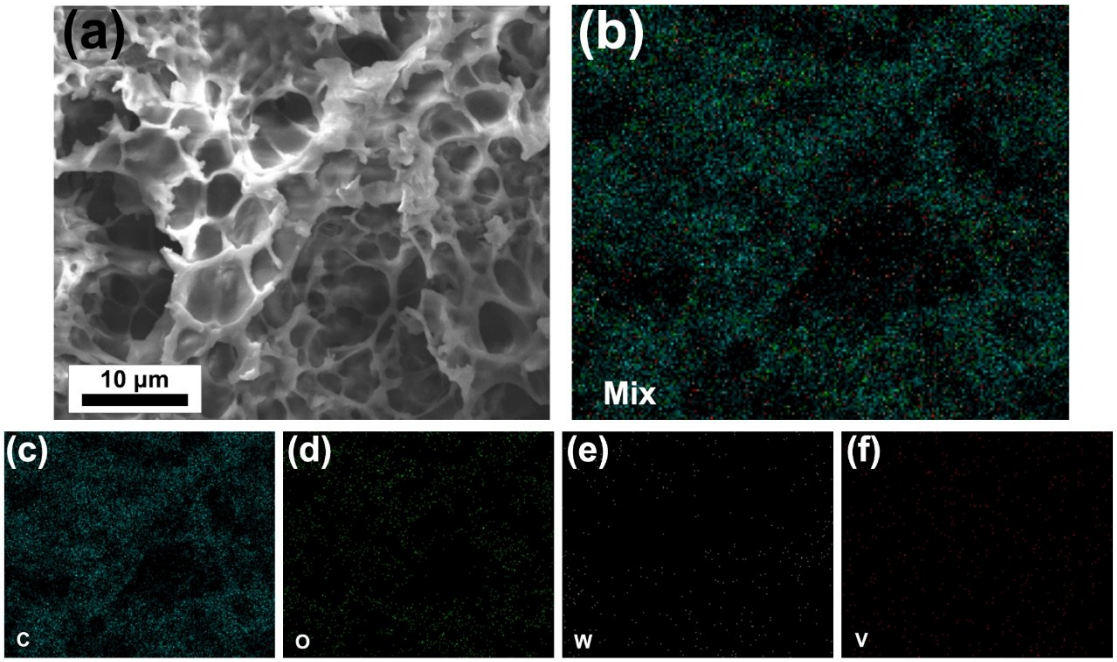


Figure S3. (a) SEM image of the polymer morphology of the as-made hybrid material from an overhead view. (b-f) The corresponding EDS mapping results of the as-made material in the SEM image.

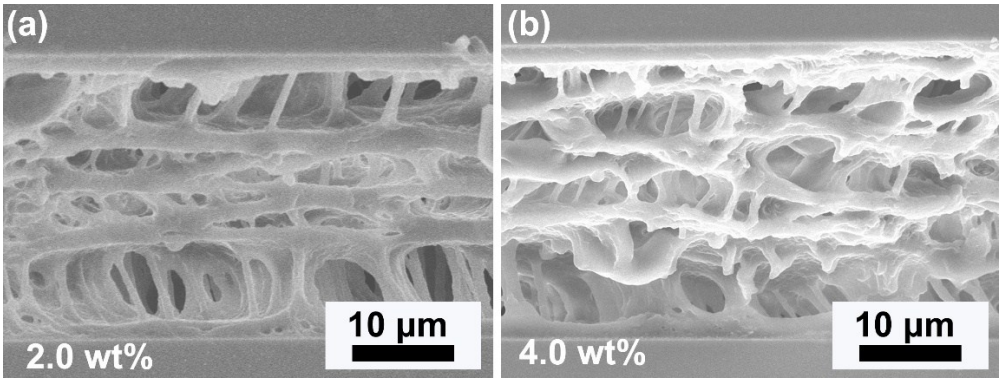


Figure S4. Corss-sectional SEM images of the as-made hybrid device containing (a) 2.0 wt% and (b) 4.0 wt% W-VO_2 NCs, respectively.