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 ---- $\Delta T_{s\text{ol}}$
- chiral nematic ---- N*
- modulation contrast ---- MC
- phase transition ---- PT
- luminous transmission ---- $T_{\text{Lum}}$
- 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
- smectic 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):

(2) Polymeric Acrylate Liquid Crystals (PALCs):

(3) Photo-initiator:

(4) Composition of the SmA-LCs Monomers:

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

(6) Composition of the PC-LCs:

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\text{SmA-LCs : N*-LCs} = 23 : 77 \text{ 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.** Cross-sectional SEM images of the as-made hybrid device containing (a) 2.0 wt% and (b) 4.0 wt% W-VO₂ NCs, respectively.