Supporting Information

Sn-W Co-doping Improves Thermochromic Performance of VO_2 Film for Smart Window

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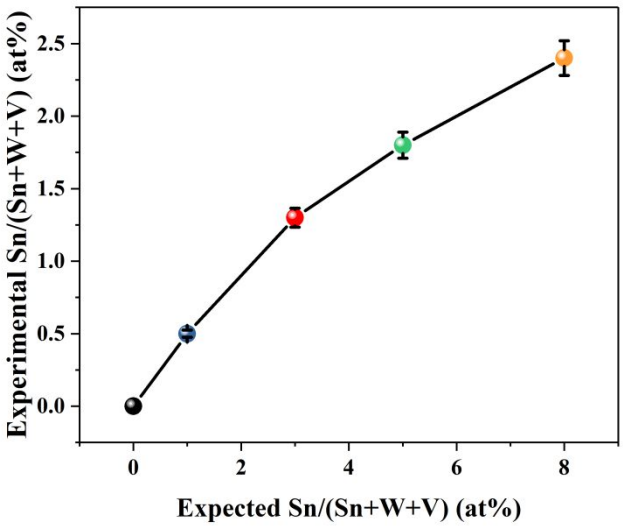

Figure S1. The Sn content of the Sn-W co-doped VO_2 films (S1-S5) determined by ICP. The abscissa is the expected composition, i.e. the input ratio of Sn/(Sn+W+V) in

the precursor solution during the hydrothermal process.

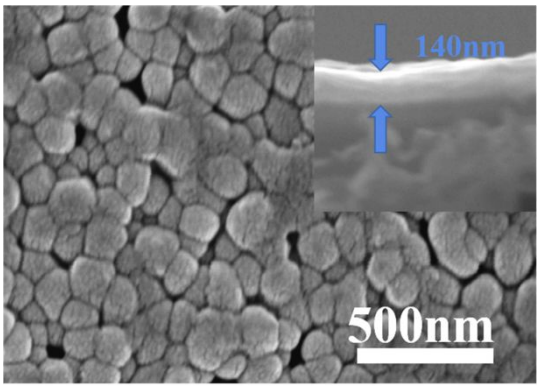

Figure S2. The SEM image of S0 film (undoped) and the inset indicates the thickness of S0 film is ~140nm.

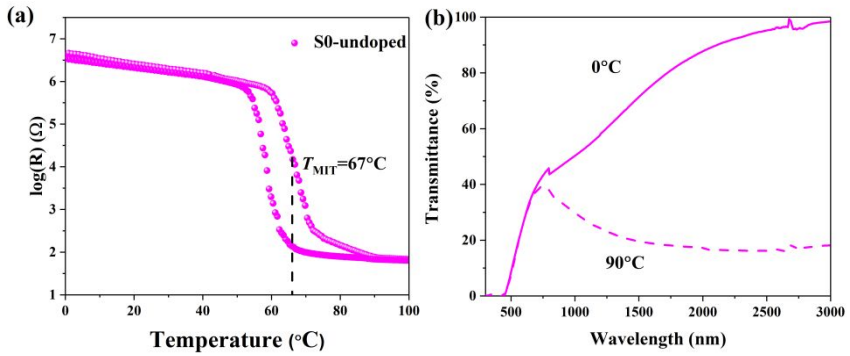

Figure S3. (a) Temperature dependent resistance of the S0 (undoped); (b) Transmittance spectra of the S0 film measured at 0 ℃ (real line) and 90 ℃ (dashed line).

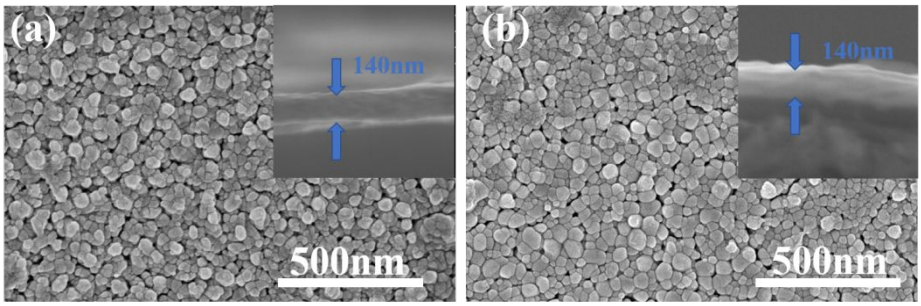

Figure S4. The SEM image:(a) S6; (b) S7. The insets are the corresponding cross-sectional views, indicating that the films possess similar thickness of ~140 nm.

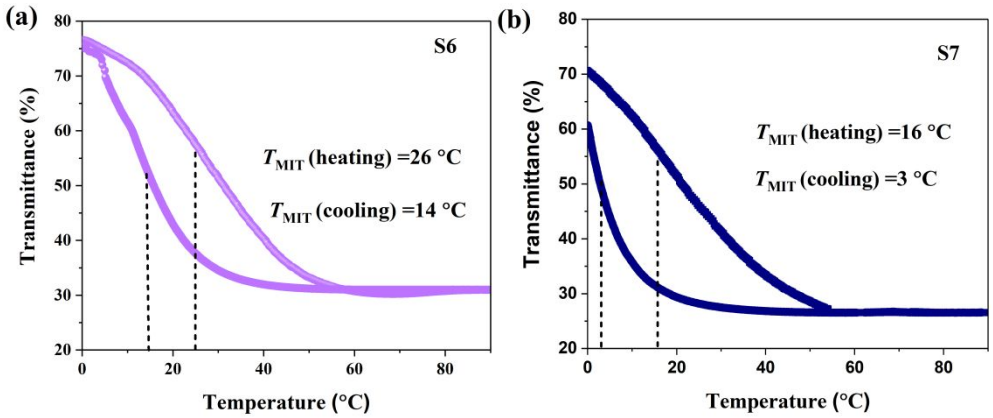

Figure S5. Hysteresis loop of the temperature-dependent transmittance (measured at the temperature range of 0 - 90℃, with a heating/cooling rate of 10 ℃/min) of the Sn-W co-doped VO_2 samples at a wavelength 2500 nm: (a) S6; (b) S7.

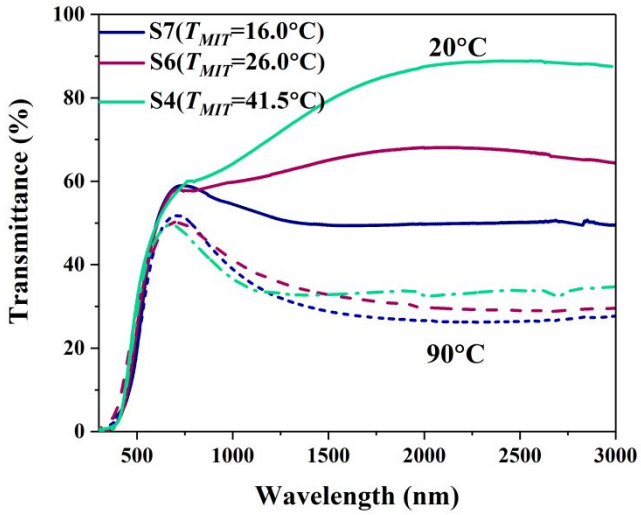

Figure S6. (a) Transmittance spectra of the Sn-W co-doped VO_2 films with different W contents (S4, S6, S7): (S4: T_{lum} ~40.7%, ΔT_{sol} ~13.6%; S6: T_{lum} ~40.2%, ΔT_{sol} ~10.5%; S7: T_{lum} ~40.4%, ΔT_{sol} ~8.9%). The real lines denote transmittance measured at 20 °C, and the dashed lines are measured at 90 °C.

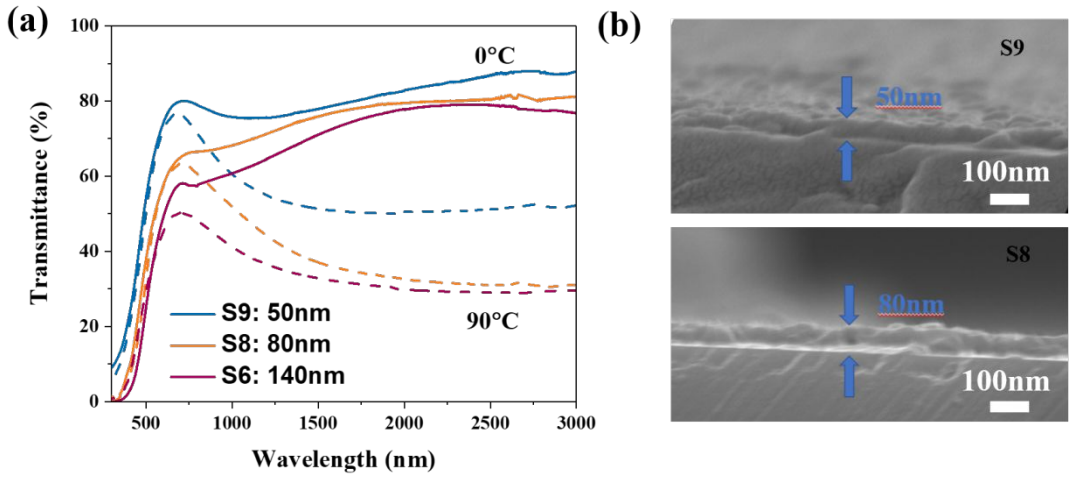

Figure S7. (a) Transmittance spectra of the Sn-W co-doped VO_2 films with different thickness: (S6: ~140 nm, T_{lum} ~41.1%, ΔT_{sol} ~12.6%; S8: ~80nm, T_{lum} ~47.7%, ΔT_{sol} ~11.3%; S9: ~50nm, T_{lum} ~63.3%, ΔT_{sol} ~9.8%). (b) cross-sectional views of S8 and S9 films.

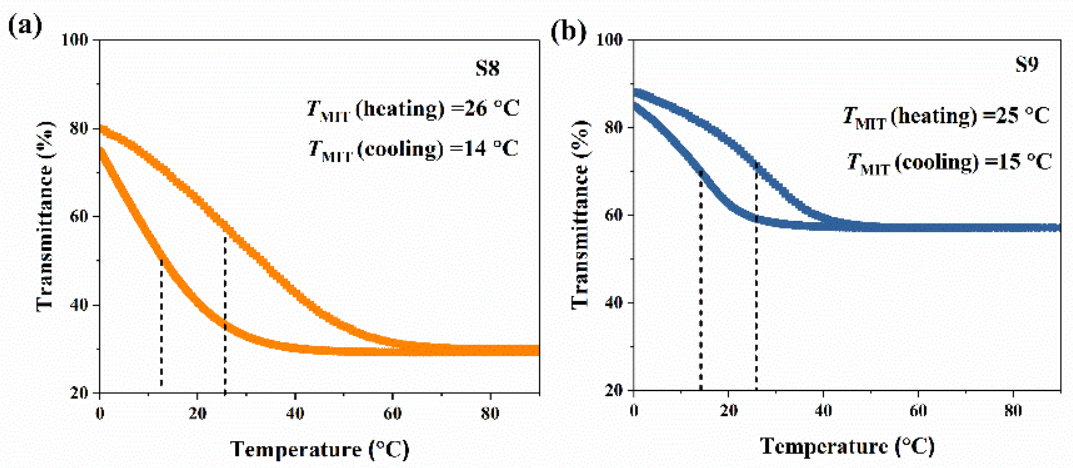

Figure S8. Hysteresis loop of the temperature-dependent transmittance (measured at the temperature range of 0 - 90℃, with a heating/cooling rate of 10 ℃/min) of the Sn-W co-doped VO_2 samples at a wavelength 2500 nm: (a) S8; (b) S9.