

Supplementary Information

for

Synthesis and thermochromic property studies on W doped VO₂ films fabricated by sol-gel method

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The interaction between aqueous or alcohol Sol-Gel and substrate is weak. So the substrates were through special treatment before spin-coating¹⁻³ or the precursor could not be dispersed on the substrate uniformly to form fine pre-deposited film and the smooth VO₂ films were not obtained finally. The distilled water and ethyl alcohol were employed as the reaction solvent to prepared precursor as most previous works before using isobutanol solvent; however, the precursors were distributed on the substrate in small droplets after spin-coating and the final films show discontinuity, as shown in the Figure S1.

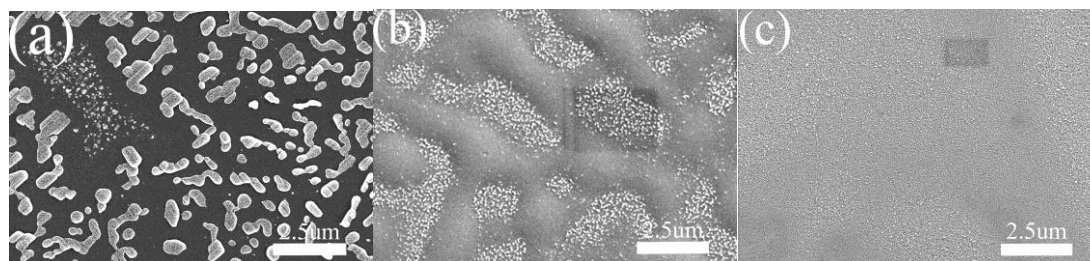


Figure-S1 The SEM images for 1% W-doped VO₂ films annealed at 470°C/4h from a) aqueous Sol-Gel, b) alcohol Sol-Gel and c) isobutanol Sol-Gel with the same

processing

From Figure-S1, there were some isolated large particles on the surface of VO₂ films by aqueous Sol-Gel and the surface become a little compact for VO₂ films by alcohol Sol-Gel. From S1 (c), the obtained VO₂ films by isobutanol Sol-Gel were dense and flat, which were superior to S1 (a) and (b) obviously.

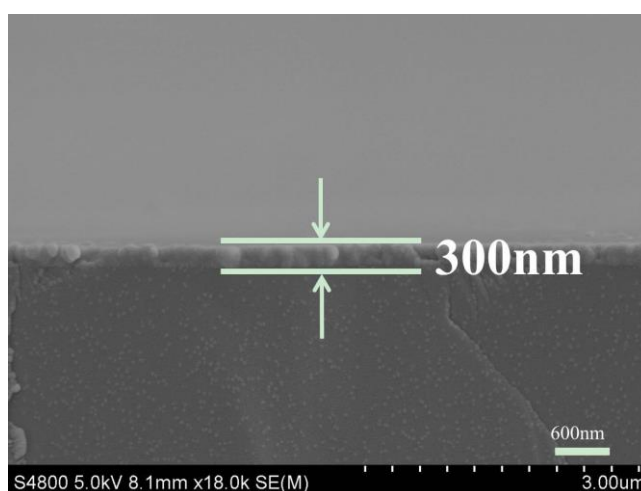
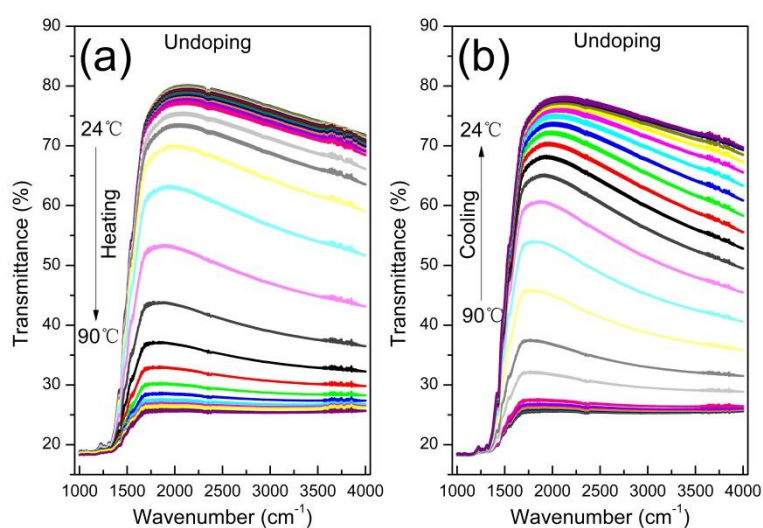


Figure-S2 The cross section SEM image for 1% W-doped VO₂ films annealed at 470°C

/4h



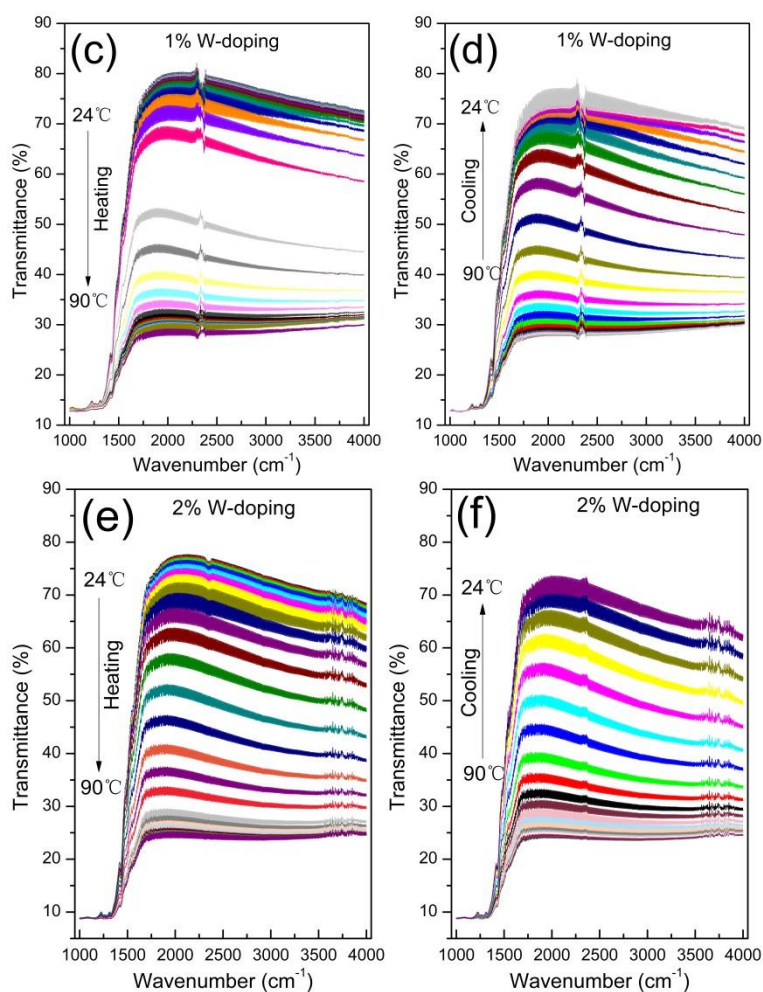


Figure-S3 The infrared transmittance curves of the undoped, 1%W and 2%W doped samples in the a), c), e) heating and b) d), f) cooling in the range of 1000-4000 cm⁻¹.

References

- 1 Monfort, O. *et al.* Reduction of V₂O₅ thin films deposited by aqueous sol-gel method to VO₂(B) and investigation of its photocatalytic activity. *Applied Surface Science* **322**, 21-27 (2014).
- 2 Lan, S.-D., Cheng, C.-C., Huang, C.-H. & Chen, J.-K. Synthesis of sub-10 nm VO₂ nanoparticles films with plasma-treated glass slides by aqueous sol-gel method. *Applied Surface Science* **357**, 2069-2076 (2015).
- 3 Chen, J.-K. *et al.* Using Solvent Immersion to Fabricate Variably Patterned Poly(methyl methacrylate) Brushes on Silicon Surfaces. *Macromolecules* **41**, 8729-8736 (2008).