Effects of calcination temperatures of W-Mo co-doped VO_2 particles on thermochromic properties

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Vanadium dioxide(VO_2) has a reversible semiconductor-to-metal(S-M) transition temperature(T_c) of approximately 68 ℃ with an abrupt electrical and optical properties change. It is possible for a few dopants to control the Tc from 68 ℃ to low temperature. In this study, W and Mo co-doped VO_2 nanopowders were synthesized via hydrolysis of vanadyl sulfate mingled with a small amount of sodium tungstate and sodium molybdate and subsequent calcination process. The W-Mo co-doped VO_2 particles were calcined at different temperatures(775-875℃) for 3h under N_2 atmosphere to study influence of VO_2 crystallnity and T_c, respectively. From the XRD and DSC results, the crystallinity is strong at 850 ℃ and its Tc change about 36 ℃ (from 68 ℃ to 32 ℃). XPS spectra revealed that Mo^{6+} and W^{6+} incorporated into the VO_2 lattice and formed solid-solution phases with VO_2. For further characterization, TEM and FE-SEM were done.