Fabrication of nanostructured vanadium oxide thin film for smart window applications

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Vanadium dioxide (VO2) has attracted much attention because it is known to undergo a reversible, thermally induced metal semiconductor phase transition. Particularly its optical properties change significantly in the visible and near IR range at its phase transition temperature (TC ~ 68℃). Therefore, this phenomenon can be applicable to smart window applications. We develop solution-phase synthetic routes, to monodisperse, organically functionalized vanadium oxide nanoparticles in order to use them as potential thermochromic materials for smart window application. As prepared vanadium oxide nanoparticles and their thin film have been characterized by means of transmission electron microscopy (TEM), scanning electron microscopy (SEM), powder X-ray diffraction (XRD), Fourier transform infrared absorption spectroscopy (FT-IR), and X-ray photoelectron spectroscopy (XPS). Results of structural and spectroscopic studies on the formation of vanadium oxide nanoparticles and their thin films as well as the effects of solution compositions, reaction conditions will be discussed together with the optical properties of vanadium oxide thin films.