

Low temperature phase transition of tungsten doped vanadium dioxide by sol-gel method

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Vanadium dioxide has been brought to many researcher's attraction for a long time because it exhibits a low temperature phase transition (67°C) from a monoclinic to a tetragonal phase. During this phase transition, an abrupt change in certain physical properties such as electrical resistivity, magnetic susceptibility and infrared transmittance occurs. In all these changes, the most important one is change of infrared transmittance. Using this property, we can apply vanadium dioxide powder to application, such as "smart window". Our main object is to provide the high quality vanadium dioxide and metal doped vanadium dioxide nanopowder. This procedure is accomplished by combining the sol-gel method and thermal treatment at the relatively low temperature. Nanopowders manufactured in our laboratory were analyzed with XRD, SEM, TEM, DSC. As a result, an average size of the tungsten doped vanadium dioxide (tungsten: 3at%) powder was less than 100nm and a phase transition temperature was reduced from 68°C to around 50°C.