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ON THE ELECTROCHROMISM OF THIN MOO3-DOPED V2O5 FILMS PREPARED BY THE SOL-GEL METHOD

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Summary: Electrochromism, the reversible change in optical properties when a smart material is electrochemically oxidized or reduced, has wide interests and practical applications. In particular, vanadium pentoxide (V2O5), the most stable form in the vanadium oxide family, has received the most attention in the field. In this study, we researched the effect of Mo doping about the microstructure and Li+ intercalations/extractions properties of V2O5 films on the surface of Indium-doped tin oxide substrates (ITO). The pure and Mo-doped V2O5 films were prepared by using the sol-gel method, followed by annealing 400℃ for 4h in the air. The films with MoO3/V205 ratio in 5/95, 3/97, 2/98, 1/99 and 100% V205 have been used for optical and electrical property investigations. The Mo-doped V2O5 thin films electrode exhibit much enhanced electrochemical performances than the pure V2O5 counterpart. The cyclic voltammetry (CV) was performed on V205/MoO3/ITO glass electrodes in an electrolyte of 1 M LiClO4 in PC at room temperature. With the increasing proportion of MoO3 doped in V2O5, all the redox peak currents of the five samples increased, suggesting that their electrochemical activity increased with the initial CV cycles. Disappearing of some phase transition peaks also show that the MoO3-doped makes electrochromic cyclical declining. Consistent with the switching response results, the films doped with high concentration have faster response, and the different response time of intercalation processes is clearer than deintercalation processes.