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Durability Improvement of Electrochromic Tungsten Oxides Films

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Electrochromic tungsten oxide films were prepared by the electron beam deposition, and the dependence of the electrochemical stability and the optical properties on the titanium concentration, and on the annealing temperature, that was investigated. Coloring and bleaching experiments were repeated by cyclic voltammetry in a propylene carbonate solution of $LiClO_4$. Spectrometry was used to assess the stability of the transmittance in the degraded films. Tungsten oxide films with titanium contents of about 10~15 mol% were found to be most stable, undergoing the least degradation during the repeated for coloring and bleaching cycles. The reason for this small amount of degradation was the reduction of lithium ion trapping sites in the films, which results in an increased durability. Tungsten oxide films with titanium contents of about 20 mol% were annealed at 200℃ for 1 hour, and this results showed that durability of films were increased.