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RF Magnetron Sputtering Deposited W/Ti Thin Film For Smart Window Applications LUTFI OKSUZ, MELEK KIRISTI, FERHAT BOZDUMAN, AYSEGUL UYGUN OKSUZ, Suleyman Demirel University — Electrochromic (EC) devices can change reversible and persistent their optical properties in the visible region (400–800 nm) upon charge insertion/extraction according to the applied voltage. A complementary type EC is a device containing two electrochromic layers, one of which is anodically colored such as vanadium oxide (V2O5) while the other cathodically colored such as tungsten oxide (WO3) which is separated by an ionic conduction layer (electrolyte). The use of a solid electrolyte such as Nafion eliminates the need for containment of the liquid electrolyte, which simplifies the cell design, as well as improves safety and durability. In this work, the EC device was fabricated on a ITO/glass slide. The WO_3-TiO_2 thin film was deposited by reactive RF magnetron sputtering using a 2-in W/Ti (9:1 %wt) target with purity of 99.9% in a mixture gas of argon and oxygen. As a counter electrode layer, V_2O_5 film was deposited on an ITO/glass substrate using V_2O_3 target with the same conditions of reactive RF magnetron sputtering. Modified Nafion was used as an electrolyte to complete EC device. The transmittance spectra of the complementary EC device was measured by optical spectrophotometry when a voltage of ±3 V was applied to the EC device by computer controlled system. The surface morphology of the films was characterized by scanning electron microscopy (SEM) and atomic force microscopy (AFM) (Fig 2). The cyclic voltammetry (CV) for EC device was performed by sweeping the potential between ±3 V at a scan rate of 50 mV/s.

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