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Improved electrochromic performance of tungsten-oxide electrode film deposited by vacuum cathodic arc plasma**Sheng-Chuan Hsu, Po-Wen Chen, Meng-Hsin Chen, Jin-Yu Wu and Der-Jun Jan**
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This paper reports on fabrication of tungsten-oxide (WO₃) electrode films on a transparent conducting coated glass substrate by cathodic arc plasma (CAP) technique. The influences of various oxygen deliveries on structural, optical and electrochemical properties of WO₃ electrode films were investigated. X-Ray Diffraction (XRD) analysis indicated that the crystal structures of WO₃ electrode film were amorphous which porous and columnar form exhibited high-rate ion injection/extraction into/out of WO₃ electrode films. We have demonstrated better Electrochromic Device (ECD) performance based on prepared WO₃ electrode film with O₂/Ar=5, that enhanced electrochromic properties in terms of shorter coloration/bleaching response times and better cycling durability. The impressive colored/bleached cycle, good ion diffusion coefficient ($4.5^2 \times 10^{-9}$ cm²/s), high optical transmittance difference (~74%), high deposition rate (~15 nm/min) and fast coloration and bleaching times (7 s and 6 s) are suggesting that columnar arrays of WO₃ electrode film deposited by the CAP technique is the promising smart window for potential electrochromic application.

Biography

Sheng-Chuan Hsu has completed his Master's degree from National Tsing Hua University and presently he is working in Division of Physics, Institute of Nuclear Energy Research. He is interested in optical materials.

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