

以電漿濺鍍技術製備電致色變薄膜及其性能之研究

The Performance of Electrochromic Thin Film Prepared by Plasma Sputtering

陶惟翰¹、田曜璋¹、楊正旭¹、林永森²

Wei-Han Tao, Yao-Wei Tian, Zheng-Xu Yang, Yung-Sen Lin

¹中國文化大學材料科學與製造研究所

Institute of Materials Science and Engineering, Chinese Culture University

²逢甲大學化工系

Department of Chemical Engineering, Feng Chia University

Abstract

In this paper, an electrochromic thin film, which is characterized by its ability to sustain reversible and persistent changes of the optical properties when a voltage is applied to it, was prepared by plasma sputtering technology. The WO_3 and NiO materials were used as the electrochromic thin film and the most promising candidate for electrochromic devices that can vary the throughput of visible light and solar energy and is called the smart windows.

The prepared electrochromic thin film, the design of charge balance, the lifetime measurement and the coloration efficiency of the electrochromic devices were experimentally investigated. Many experimental and operational parameters, which are DC or RF power generator, powers, operation pressures, operation gases and the ratio of mixture, gas flow rate various target compositions, distance between sample and target and electrode design, sputtering time were used to design the electrochromic thin film by plasma sputtering technology. The prepared electrochromic thin film was experimentally tested by using the spectroscopy and cyclic voltammetry in order to get the optimum operation conditions.

Keywords : Electrochromic Thin Film; Plasma Sputtering; Cyclic Voltammetry