Turkish Journal of Chemistry

Turkish Journal

of

Chemistry

Application of Proton Conducting Polymer Electrolytes to Electrochromic Devices

Ayhan BOZKURT
Fatih University, Department of Chemistry,
34900 Büyükcekmece, İstanbul-TURKEY
e-mail: bozkurt@fatih.edu.tr

Keywords
Authors

chem@tubitak.gov.tr

Scientific Journals Home Page

Abstract: Electrochromic display devices have been fabricated using Polydiallyldimethylammonium dihydrogenphosphate ($PAMA^+$ $H_2PO_4^-$) blended with H_3PO_4 as the electrolyte and WO_3 as the electrochromic film. The WO_3 deposited glass electrodes were doped with protons to form H_xWO_3 in which color depends on the charge density (CD) ranging from 0.01 to 0.04 C/cm^2. Proton conducting films of $PAMA^+$ $H_2PO_4^-$ 2 H_3PO_4 (2 moles of acid per polymer repeat unit) were sandwiched between two electrodes to obtain the following symmetric configuration: Glass/ITO/WO_3/H^+ -electrolyte film/H_xWO_3 /ITO/Glass. Prior to construction of the electrochromic windows, the electrochemical stability of polymer/acid blends was determined via cyclic voltammetry (CV).

Key Words: Electrochromic Window, Poly(diallyldimethylammonium dihydrogenphosphate), Proton Conductor

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Turk. J. Chem., **26**, (2002), 663-668.
Full text: pdf
Other articles published in the same issue: Turk. J. Chem.,vol.26,iss.5.