All Solid-State Electrochromic Devices with Gelatin-Based Electrolyte

César O. Avellaneda[a,b,*], Amal Alkahlout[a], Sabine Heusing[a], Agnieszka Pawlicka[c], Edson R. Leite[b] and Michel A. Aegerter[a]

[a] *Leibniz-Institut für Neue Materialien gem. GmbH, Im Stadtwald Geb. 43, 66123 Saarbrücken, Germany*
[b] *LIEC-Departamento de Química, Universidade Federal de São Carlos C.P. 676, CEP 13565-905, São Carlos-SP, Brazil*
[c] *Departamento de Físico-Química, Instituto de Química de São Carlos Universidade de São Paulo, C.P. 780, CEP 13560-970, São Carlos-SP, Brazil*

avellane@dq.ufscar.br

Pure and doped niobium oxide (Nb_2O_5) layers are electrochromic (EC) materials which change their color by insertion of Li^+ ions from transparent to brown, grey or blue depending on the dopant and the crystallinity of the layer. 6×8 cm^2 EC-devices with the configuration K-glass/EC-layer/electrolyte/ion-storage (IS) layer/K-glass, were produced using Nb_2O_5:Mo EC-layers, a $(CeO_2)_x(TiO_2)_{1-x}$ IS-layer and a gelatin electrolyte. The grey coloring of all-solid-state sol–gel devices show a reversible coloration with ΔOD=0.15, a long-term stability of more than 50000 switching cycles, a transmission variation of 20 % at 550 nm after potentiostatic coloration and a coloration efficiency of 23 cm^2/C.

Keywords: Solid electrolyte, Li^+ conductivity, gelatin, electrochromic devices, Nb_2O_5:Mo.