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Electrochromic properties of nickel oxide films prepared by spray pyrolysis method

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Electrochromic nickel oxide films were deposited onto fluorine-doped tin oxide coated glass substrates by using spray pyrolysis method. The effects of substrate temperature on electrochromism were studied. Transparent NiO films were obtained at substrate temperatures of 300, 375, 400 and 450°C. XRD studies reveal that all the films are polycrystalline with face centered cubic structure and exhibit (1 1 1) and (2 2 2) preferential orientations. The electrochromic properties of the NiO films were studied in 0.3 M KOH aqueous alkaline electrolyte at a scan speed of 20 mV/s using cyclic voltammetry (CV), chronoamperometry and UV spectrophotometry. *Ex situ* transmittance spectra showed optical contrast between colored and bleached states. Structural transformations during CV measurements were studied by field emission scanning electron microscopy and Raman spectroscopy. For the film deposited at 300°C, current density values which continuously evolve with increasing number of cycles up to 100 which indicates loosening of the structure. Depending on the substrate temperature, the amount intercalated and de-intercalated charges during CV scan dropped. NiO films exhibit good reversibility between 0.7 and 0.9.

Biography

Turan Taşköprü currently works as a Research Assistant in Physics Department, Anadolu University, Turkey since 2009. His studies focused on inorganic film deposition and characterization techniques. He has published several papers regarding to the inorganic film deposition and characterization.

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