Electrochromic Properties of Mixed Oxides based on Titanium and Niobium

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In the past years a strong progress in the field of rechargeable batteries has been achieved. This directly relates to electrochromics [1]; as such electrochromic systems are simply thin film batteries. From this advancement new electrode materials with high charge capacity have appeared. These new materials are also candidates for electrochromic applications, *e.g.*, $LiFePO_4$ (LFP) [2, 3] or most recently $TiNb_2O_7$ (TNO) [4–8]. At present however little is known about the electrochromic properties of crystalline $LiFePO_4$ and none about crystalline $TiNb_2O_7$. The present study therefore aims to prepare binary Niobium and Titanium based oxide compounds, and to investigate their combined intercalation and optical properties. Therefore titanium niobium mixed oxide films have been deposited by reactive magnetron serial co-sputtering. After post annealing at 650 °C in air, a monoclinic $TiNb_2O_7$ phase was achieved. Lithium intercalation properties were determined and cathodic switching behavior has been demonstrated for this material. Maximum switching of the integral visual transmittance of 16.8 % has been determined for this sample with a thickness of 156 nm.

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