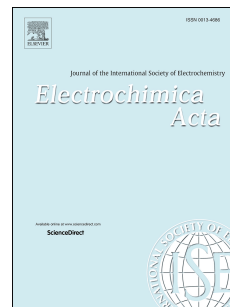


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High capacity and performance lithium based electrochromic device via amorphous tantalum oxide protective layer

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Abstract

Electrochromic devices (ECDs) composed tungsten oxide (WO_x) and nickel oxide (NiO_x) films have attracted extensive attention due to the high transmittance contrast, the short response time and the low power consumption which represent a better prospect of applications. Even though a lot of efforts have been made to improve the stabilities and the cycling life of the ECDs, however, the effects are unsatisfactory, because the physical mechanisms of the degenerate properties are still not clear. Meanwhile, an easy processing and low cost manufacture method by composing functional devices are still insufficient. We hereby present an effective method to obtain a high capacity and performance lithium based ECDs by using of amorphous tantalum oxide (Ta_2O_5) protective layers, which can be used to improve the surface morphologies of NiO_x films, effectively protect the films from the slightly acid environment of the electrolyte and reduce the leakage. Five-layer structures ECD1 ($\text{ITO}/\text{NiO}_x/\text{Li}^+$ based gel polymer electrolyte/ WO_x/ITO) and six-layer structures ECD2 ($\text{ITO}/\text{NiO}_x/\text{Ta}_2\text{O}_5/\text{Li}^+$ based gel polymer electrolyte/ WO_x/ITO) are

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