

ELECTROCHROME-Nb₂O₅ FILMS- BASED CHEMICAL SENSOR

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Abstract

As it was reported earlier, the operation of a chemical sensor with semiconductor oxide layer is based on the variations in oxide electric resistance caused by the changes in surface concentration of the adsorbate charged molecules in the latter. Application of an oxide layer with electrochrome properties as a semiconductor permits to visualize adsorption processes on the adsorbate/ oxide contact thanks to the observed variations in oxide colors. The essence of electrochromic material under electrical or electromagnetic fields. As a result coloration centres are formed on the surface and in the bulk of the film. The concentration of coloration centres is easily varied both the changing of external influence and by technological methods during film growth. The paper studies the operation mechanism of the electrochemical sensor based on electrochrome anode Nb₂O₅ both in amorphous and polycrystalline states. (It should be noted that crystallized Nb₂O₅ films showed excellent electrochromism). It is shown that such oxide is extremely sensitive to the presence of adsorbate molecule, which results in dramatic change resistance and optic absorption factor of Nb₂O₅ layers. It has been found that the observed variations in niobium pentoxide physical properties and reversible, and the mechanism of such variations has been investigated. The model of chemical sensor based on electrochrome layers of anode niobium pentoxide has been proposed.