

# STUDY THE ELECTROCHROMIC CHARACTERISTICS MATERIALS ON COMPLETE ELECTROCHROMIC UNITS

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In our project we study the electrochromic characteristics materials on complete electrochromic units. They have two ITO glasses. On the first is a coating of  $V_2O_5$  and on the second is a coating from  $WO_3$ , and between this glasses is a conductive gel. After proper voltage is applied this units become brown.

First experiments were done so that the deposit of this coatings was done pyrolytically. Unfortunately, this technology was unsuccessful and the glass substrates cracked. This method was performed so that the glasses were cleaned by ethanol and then heated using a heater. Further we started to use ITO glasses manufactured by vacuum deposition. Then we laid the ITO glass substrates on the heater and sprayed the coating. We blew air to spray device and deposited the coatings under the stream of air. But drops were heavy and caused that that ITO glasses crashed.

Further, we tested the deposition of peroxocompounds onto ITO glass. We succeeded to deposit  $WO_3$  from the solution of  $WO_3$  in  $H_2O_2$  under formation of peroxotungstic acid. Layers obtained by this method had good optical properties and the coating was solid and a homogenous distribution.  $V_2O_5$  did not create layers of this properties because as it did not yield in a good spraying. At  $V_2O_5$  solution in  $H_2O_2$  the substance deposited itself on the center of the glasses and did not cover the edges. We tried to suppress the big drops on the glasses but the deposits were non – transparent, not enough solid and they contained visible crystals on the surface.

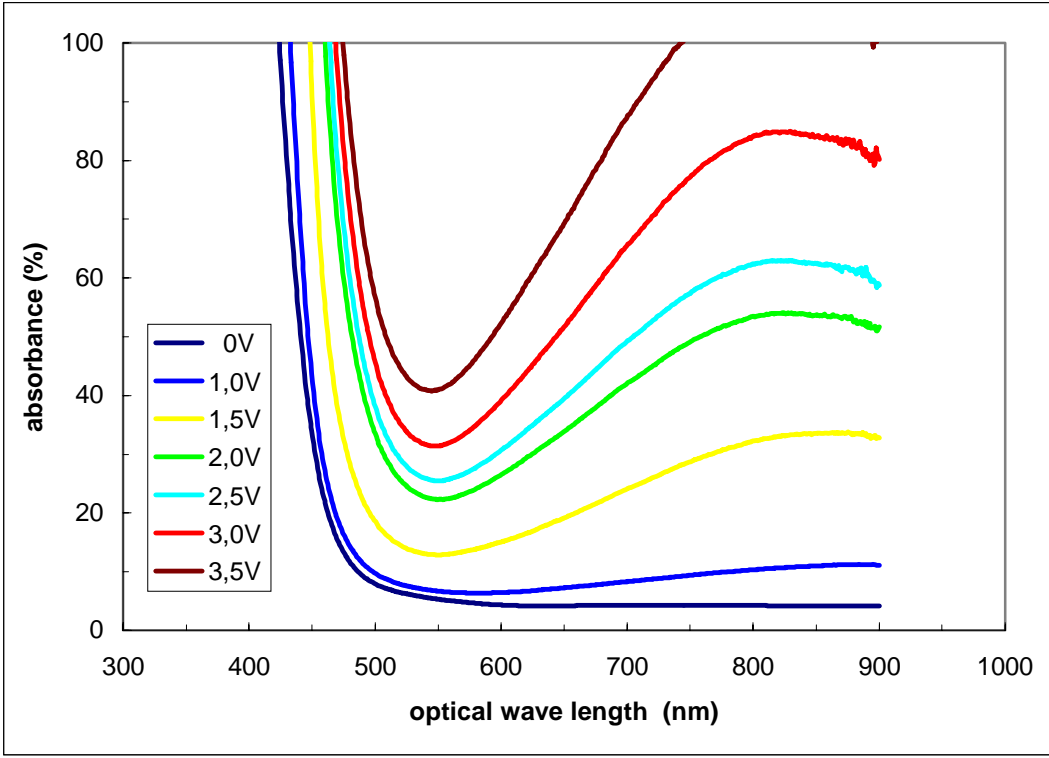
Today we work to improve the procedure of  $V_2O_5$  deposition on the surface of ITO covered glasses. Coatings of  $WO_3$  were tested and results seem very interesting. Afterthat we completed an electrochromic element ,which contained  $WO_3$  prepared from the solution in the  $H_2O_2$  and  $V_2O_5$  deposited by vacuum evaporation. We investigated the voltammetric curves and optical characteristics.

Our results are depicted in attached graphs. We have compared an element containih bot vacuum deposited layers and an element where the  $V_2O_5$  layer was prepared by spray deposition.

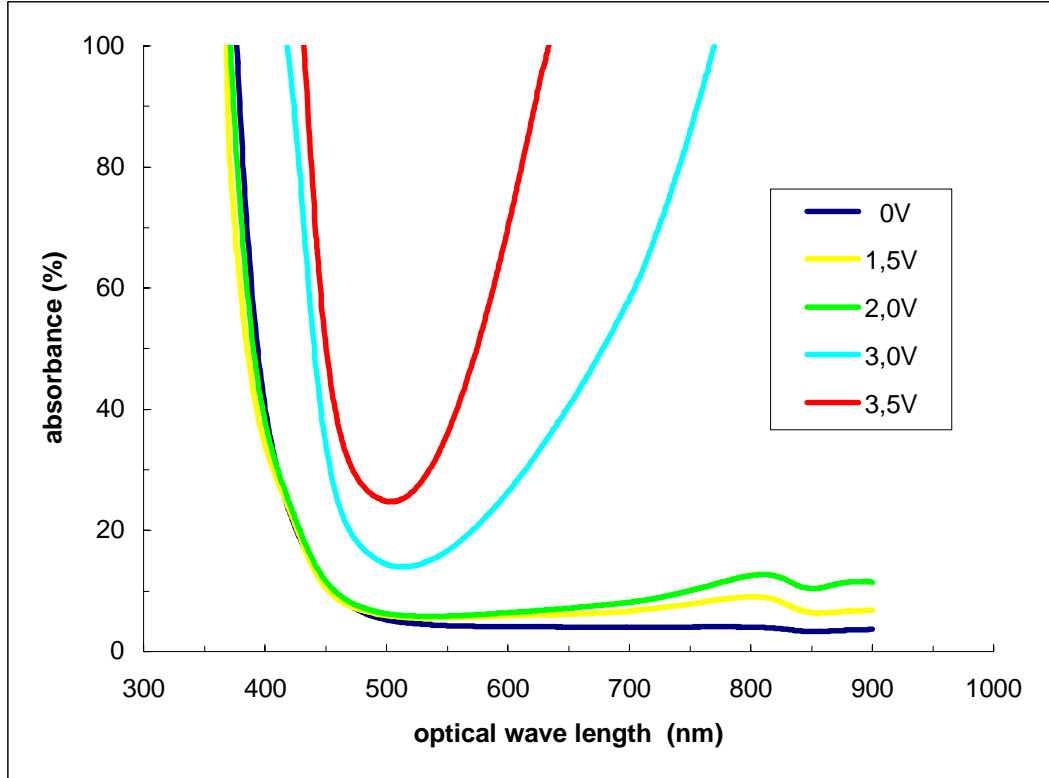
## **Acknowledgments:**

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**Graphs:**



**Fig.1.** *WO<sub>3</sub> and V<sub>2</sub>O<sub>5</sub> deposited by vacuum evaporation*



**Fig.2.** *WO<sub>3</sub> prepared from the solution in the H<sub>2</sub>O<sub>2</sub> , V<sub>2</sub>O<sub>5</sub> deposited by vacuum evaporation*