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Effect of ZnTe doping on the chromogenic properties of MoO_3 thin films

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Abstract – Single-layer ZnTe-doped MoO_3 thin films were deposited by thermal evaporation on glass substrates and their photochromic and thermochromic properties were evaluated by means of optical absorption. Additionally, the structural characterization of the films was performed by atomic force microscopy and scanning electronic microscopy. It was found that the generation of color centers becomes more efficient in a MoO_3:ZnTe single-layer film than in undoped MoO_3 films.

Molybdenum oxide (MoO_3) is a transition metal oxide showing outstanding optical and electronic properties and has become a promising material for applications in electrochromic display devices. Additionally, MoO_3 presents photochromic and thermochromic properties, that is to say, it has the ability to form color centers following light irradiation and thermal treatments, respectively.

It has been shown that the photochromic properties of MoO_3 can be enhanced by depositing an interlayer of cadmium sulfide (CdS) between the substrate and the MoO_3 thin film [1]. This result is explained in terms of charge carrier injection provided by the CdS layer into the MoO_3 film. Recently, we have reported on the effect of ZnSe doping on the chromogenic properties of MoO_3.

In this work, single-layer ZnTe-doped MoO_3 thin films were deposited by thermal evaporation on glass substrates and their photochromic and thermochromic properties were evaluated by means of optical absorption. Additionally, the structural characterization of the films was performed by atomic force microscopy and scanning electronic microscopy. It was found that the generation of color centers becomes more efficient in a MoO_3:ZnTe single-layer film than in undoped MoO_3 films.

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