



Iranian Journal of Physics Research, Vol. 18, No. 3, 2018

Investigation of pulse width effect on the structural and optical properties of molybdenum oxide thin films deposited by HiPIMS

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(Received 24 January 2018 ; in final form 04 March 2018)

Abstract

In this study, molybdenum oxide thin films were deposited by using high power impulse magnetic sputtering (HiPIMS) at different pulses length of 60, 90, 120, 150 and 180 μs on glass substrates in a combination of reactive and non-reactive gases with a ratio of $\text{O}_2/\text{Ar} = 0.66$. The structural and optical properties of these coatings were studied. The chemical composition of these metal oxides was determined by analyzing X-ray photoelectron spectroscopy (XPS) and by MoO_x stoichiometry with different x -values. By studying the optical properties, it was found that the oxygen deficiency occurring with the increase in the pulse width reduced the average of optical transmittance and the optical band gap of the coatings.

Keywords: magnetron sputtering, thin film, molybdenum oxide, optical properties

For full article, refer to the Persian section