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Optical Properties and Aging of Gasochromic WO₃ RUDRESH GHOSH, University of North Carolina at Chapel Hill, Dept of Physics and Astronomy, MATTHEW B. BAKER, RENE LOPEZ, University of North Carolina at Chapel Hill — WO₃ as a possible optical gas sensor has gained increasing importance with H₂ becoming a major fuel of the future. This has led to efforts to understand the theoretical and practical aspects of the gasochromic behavior of WO₃. WO₃ films were fabricated using pulsed laser deposition (PLD). Morphological and stoichiometric ratios of films obtained were observed as functions of deposition parameters. We present the optical constants induced by 2% H₂:Ar in WO₃ films. This allows us to obtain the limits of the gasochromic change in comparison to ion injection. It was found using Langmuir's adsorption equation that at low H₂ concentrations a high sensitivity is predicted but the coloration could saturate at 57.9 % of the material's maximum ion adsorption. Poisoning of the films was also addressed by coating with a permeable polydimethylsiloxane layer. It is shown that gasochromic degradation is prevented thus eliminating common atmospheric gases as possible contaminants. Our studies suggest WO₃ thin films as highly sensitive and stable optical hydrogen sensors. .

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