# Optical hydrogen sensing properties of nanostructured Pd/MoO3 films.


## Abstract

In this work, molybdenum trioxide (MoO3) nanostructured films were deposited onto quartz substrates via thermal evaporation of MoO3 powder. Subsequently, a catalytic palladium (Pd) layer was deposited onto MoO3 layer by e-beam evaporation. Scanning electron microscopy (SEM) revealed MoO3 nanorods grown in various directions and X-ray diffraction (XRD) confirmed the growth of orthorhombic MoO3. Optical hydrogen (H2) sensing performance of nanostructured Pd/MoO3 films were investigated at a concentration between 0.06-1%. It was observed that the nanostructured films exhibited excellent gasochromic characteristics and remarkable absorbance changes in near infrared (NIR) wavelength range (750-1000 nm) when exposed to H2. Pd/MoO3 T90% response and recovery towards 0.06% H2 were 150 and 300 s, respectively. The film operating temperature was also found as low as 120 °C.



**Keyword:** Pd/MoO3 Nanostructures; Optical hydrogen sensing; Thermal evaporation.