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## Spectral Energy Performance of Tungsten Oxides for Electro Chromic Applications

The existence of electrochromic effects among various metal oxide films are as they change their optical transmittance upon charge insertion and extraction. The integration of these materials into multilayer devices suits for optical modulations which are being developed for the application of 'smart' windows that are at the forefront of emerging energy saving advances in civil technologies. Specifically, tungsten oxides are a kind of metal oxides with excellent electrical and optical properties which have been proved as a promising candidate for electrochromic applications. Today, we are presenting the better performance of pure and Mg, Mn & Ni doped tungsten oxide thin films on conducting glass plate (ITO) substrate. The structural properties of the prepared thin films are investigated by powder X-ray diffraction studies, annealed at different temperatures. This study reveals that the products are belong to orthorhombic and monoclinic phases, respectively. The optical properties of the thin films are discussed to the operated range. Results from the voltammetry measurements showed the better electrochemical performances at standard conditions and functional groups are analyzed by Raman spectroscopic technique. The study of optical energy performance of the present thin films in the fully bleached, fully colored states and intermediate states were found. The comparison of the performance of these thin films with the available low electrochromic windows showed the suitability of the materials. All the results supports that the materials have good optical and electrochromic properties with long term durability.

**Keywords** Shape Memory Effect, Martensitic Transformation, Superelasticity, Twinning, Detwinning

### Biography:

Dr. V. Hariharan is an Assistant Professor & Head of the Department of Physics, Mahendra Arts & Science College, Salem, since 2009. Dr. V. Hariharan completed his Ph.D degree at Bharathiar University, Coimbatore and his Post Graduate studies at Periyar University, Tamilnadu, India. His research interests lie in the area of metal oxide based semiconducting nanomaterials for Smart windows, Sensor and Superconducting applications. Dr. Hariharan published more than 30 research articles in reputed international journals. He is actively collaborating with researchers in several other disciplines including Chemistry and Bio Technology. He also is collaborating with Alagappa University, Periyar University, Indian Institute of Science, SRM University and Indian Institute of Science on various problems on nanotechnology. He also collaborating with International Organisations likes Pusan National University, South Korea and Aalto University, Finland. Dr. V. Hariharan has served more than 20 conference and workshop program committees. He currently serves on the Optical Society of India.