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Transition metal oxide thin films-applications

K V Madhuri
VFSTR University, India

Transition metal oxides (TMO) is an interesting group of solid materials with a wide variety surface structures which affect the surface energy of these compounds and influence the chemical properties, optical, electrical and magnetic properties. The unusual properties of these oxides are due to the unique nature of outermost d- electrons. The general formulae of transition metal oxides $MnO_{2n\pm 1}$ where M represents the transition metal. They have two dimensional vander Waal's bonded layered structures (Ex: V_2O_5, MoO_3 --) or three dimensional frame work tunnel structures (Ex: $WO_3, LiCoO_2$ ----) which lead the materials for their applications in the field of Electrochromic and opto electronic devices. The combination of solid state materials science with thin film technology has significantly reduced the size of component and leads to miniaturization of display devices in the emerging technology.

TMOs can be deposited as thin film by Physical Vapour Deposition (PVD) like thermal, electron beam , sputtering, so on and chemical vapour deposition (CVD) techniques like sol-gel, spin coating, spray pyrolysis so on. Thin film deposition in PVD technique consists of three major phases. In the first phase, the material should be in the proper form to deposit. In the second stage, it is transported through the medium and in the third stage it should deposit on the substrate to form a continuous film. Depending on the deposition parameters such as oxygen partial pressure, substrate temperature etc., one can deposit amorphous, polycrystalline and nanocrystalline thin films for their effective utilization in devices. These films will be characterized for their composition, structure, morphology, vibrational and optical studies by using X-ray photo electron spectroscopy, X-ray Diffraction, Atomic force microscopy, InfraRed Spectroscopy , Raman Spectroscopy and UV-VIS Spectroscopy.

Biography

K.V. Madhuri has completed her PhD at the age of 27 years from Sri Venkateswara University and postdoctoral studies from Universite de Moncton, CANADA. She is the Assoc. Professor & Assoc. Dean of Research & Development, in an esteemed University. She has published 19 papers in reputed national/international journals and has been serving as an editorial board member of reputed journals. She had presented about 27 research papers in national/International conferences. In addition to this, she had delivered invited talks in reputed institutes/conferences/Workshops/Orientation programs. She had recently finished a project under young Scientist scheme by Department of Science & Technology, New Delhi, India.

kvmsvu@gmail.com

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