Seminar

Institute for Plasma Research

Title : Molecular Beam Epitaxy (MBE) grown Molybdenum Oxide Nanostructures: Growth, Characterizations and Applications

Speaker: Dr. Paramita Maiti
IOP, Bhubaneshwar

Date : 9th July 2021 (Friday)

Time : 03.30 PM

Venue : Online - Join the talk:
https://meet.ipr.res.in/Dr.ParamitaMaiti_PDFTalk

Abstract :

For more than two decades, nanostructures of transition metal oxides (for example, WO_3, MnO_2, SnO_2, TiO_2, MoO_3, etc.) have been studied with great zeal due to their interesting properties. However, to synthesize well-ordered and oriented 1-D or 2-D oxide nanostructures by simple growth methods has proven to be a great challenge. Among the many oxide materials, molybdenum oxide is arguably the most fascinating and versatile due to its unique physical and chemical properties. Our work is based on the growth and characteristics of defect free, mixed phase free molybdenum trioxide (β-MoO_3) on varied substrates and using catalysts (Ag, Au). The phase transition from β-MoO_3 to MoO_2 and then to Mo by thermal reduction process in reduced oxygen partial pressures has been studied in detail. Effect of different thickness of molybdenum oxide nanostructures and growth conditions on their properties, such as, the optical band gap, local work function and field emission are reported. Annealing of Molybdenum Oxide thin films in controlled oxygen partial pressures also play an important role. Several methods, such as, GIXRD, SEM, TEM, AFM, XPS, RBS, EDX, KPFM, UV-Vis have been used to characterise the nanostructures and their applications.