

# Seminar

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## Institute for Plasma Research

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**Title :** Tailoring the composition of copper oxide thin film using reactive magnetron sputtering  
**Speaker:** Dr. Infant Solomon Vinoth  
PSED-FCIPT, Institute for Plasma Research, Gandhinagar, Gujarat  
**Date :** 29 August 2022 (Monday)  
**Time :** 11.30 AM  
**Venue :** Online- Join the talk:  
[https://lobby.ipr.res.in/InfantSolomon\\_PDFextension](https://lobby.ipr.res.in/InfantSolomon_PDFextension)

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Abstract: Copper is well recognized for its thermal and electrical conductivity as well as antimicrobial activity. On the other hand, it forms its own oxides which are unpreventable. The various copper oxide phases show slightly modified properties in its surface level which lead to various applications in wearable electronics, transparent conducting oxides (TCO), gas sensors, heat proof and anti-odor dressing etc. [1-3]. In this work set of experiments has been performed to study various oxide (Cuprous and Cupric) formation with the help of partial oxygen environment as a controlling parameter.

Significance of oxygen partial pressure on formation of various copper oxide phases has been observed and comparison between bulk and surface properties of the coatings has also been made. This can be extended to diverse applications since, the surface properties can be tailored by as-deposited film composition. The coatings have been deposited with and without oxygen presence in various partial pressures to enhance the copper oxide formation. The oxide formation has been confirmed by Micro-Raman analysis which is also observed in the surface morphology of coatings from Scanning Electron Microscopy (SEM). The samples were studied for their elemental and phase compositions using Energy Dispersive X-Ray Analysis (EDX) and X-Ray Diffraction (XRD). Varying oxygen partial pressure found to help formation of cupric and cuprous oxides in varying quantity. Further detailed analysis has been performed using X-Ray Photoelectron Spectroscopy (XPS) and selected samples have been subjected to leaching process and quantified using Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) analysis. The results have been correlated to find the optimum oxygen partial pressure for enhancing particular oxide phase.

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