

Seminar

Facing the Interface: What Happens When Two Electrically Insulating Metal-Organic Materials Meet?

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Heterostructured thin films of electrically insulating transition metal oxides are important research platforms for the realisation of interesting interfacial phenomena like emergent magnetism, metallic conduction, high-mobility electron gas, culminating to superconductivity. Here, we have focused on the fabrication of heterostructured thin films of coordination polymers (CPs) and measurements of electrical conductance across the thin films. CPs are crystalline solids that are constructed upon an extended coordination of metal centres and organic linkers, and are also often found to be electrical insulators. Using Cu-based CPs, we have designed various distinctive heterostructures with different organic ligands and respective thin films were grown on functionalised Au and FTO (fluorine doped tin oxide) substrates by employing the layer-by-layer (LbL) technique. Electrical transport measurements across the thin films revealed emergence of p-n junction interface and an unusual metallic conduction was also identified which was attributed to be due to charge-transfer across the interface. Overall, the results obtained open up new avenues for the design and development of functional materials in thin film configurations for various electronic and electrochemical device applications.

Friday, Jan 19th 2024

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Auditorium, TIFR-H