SCDT – FlexE Centre Webinar Series

The webinars aim to bring together researchers in Flexible Electronics and allied areas from across India (and other countries) on a single platform to promote professional interaction.

Webinar by

Dr. Bhola Nath Pal
School of Material Science and Technology
Indian Institute of Technology (BHU) Varanasi

on

"Plasmonic transparent conducting thin films for photodetector and solar cell application"

Date: 15th July 2025
Time: 7:30 PM to 8:30 PM

Visit www.iitk.ac.in/scdt/webinars.html to access the zoom link to join the webinar.

The event will be chaired by
Dr Vipin Amoli
Rajiv Gandhi Institute of Petroleum Technology, Amethi

Abstract of the Webinar

Our group has developed a unique technique to grow the Ag clusters inside a TiO_2 matrix (Ag-TiO_2) in thin film form through a low temperature (~100 °C) solution processed synthesis technique. This Ag-TiO_2 thin film has been used for various applications including developing transparent conductor, transparent heat reflector, SERS substrate, antibacterial coating, memristor devices and various plasmon-induced hot electron devices. Out of these, transparent conductors can be deposited through a two steps deposition process that include solution processed Ag-TiO_2 thin film deposition and subsequent Ag or Au deposition by thermal evaporation process. The optical transparency of Ag/Ag-TiO_2 and Au/Ag-TiO_2 thin film are ~70 % and ~85% respectively in the visible region whereas their conductivities are within the range 5-10 Ω/□. These optically transparent thin films have been used as electrodes for a photodetector and solar cell where these electrodes have dual roles; as transparent conductor and plasmon induced photocurrent generation that effectively enhances the photosensitivity of a photodetector and power conversion efficiency of a solar cell very significantly. Our recent work on organic photovoltaic (OPV) solar cells indicates, by using this transparent conductor, open circuit voltage of the device can be enhanced by ~ two times without reducing its short circuit current that effectively increases the efficiency of the OPV device by ~ two times. .

Information about the speaker

Dr. Bhola Nath Pal is a professor of School of Material Science and Technology, IIT(BHU). He did his B. Sc. and M. Sc. (in Physics) from University of Calcutta and PhD from Indian Association for the Cultivation of Science (2005). He was post-doctoral fellow at Johns Hopkins University, Los Alamos National Laboratory and at University of Queensland before he joined in IIT(BHU) in 2014. He has published more than 100 papers in peer reviewed international journals and has three US and 10 Indian patents. His research area is on solution processed thin films for electronics, optoelectronics, energy applications.