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## Metal-TiO<sub>2</sub> nano-photocatalysts for detoxification of toxic pesticides, dyes, polyaromatics pollutants and bacteria under UV-sunlight irradiation

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This talk will demonstrate the preparation, characterization and photo catalytic activities of different size and shape of metal-TiO<sub>2</sub> Nano catalysts for advanced oxidative degradation of toxic pesticides, dyes, polyaromatic hydrocarbons and photo killing of pathogenic and agrobacteria bacteria present in wastewater and agricultural land under UV-visible and sun light irradiation. The various crystal phases of titania and its different anisotropic shapes and sizes exhibit high photo catalytic activity will be presented in this lecture. It is highly desirable to have full control of the design and fabrication of specific catalyst-co-catalyst interfacial junctions with specific metal NPs geometries in order to tune activity and selectivity of many chemical reactions. It revealed that this geometric asymmetry and size (scheme 1) of Nano catalysts and co-catalysts (Fe, Au, Ag and Cu) nanoparticles remarkably modify the photo catalytic and catalytic activity as compared to bulk materials. For example, Ag/Fe-TiO<sub>2</sub> exhibited the highest rate for the oxidative degradation of imidacloprid methyl parathion, dyes and pyrene and their probable pathway for complete mineralization to various intermediates photoproducts to CO<sub>2</sub> and fate of different heteroatoms present in these pollutants under direct sunlight (40-50 mW/cm<sup>2</sup>) exposure will be discussed for plausible applications.

### Biography

Bonamali Pal has completed his PhD from Indian Institute of Technology, Mumbai, India and Postdoctoral studies (7.5 years) from Japan Science and Technology Agency, Kushu Institute of Technology, Catalysis Research Center, Hokkaido University, Japan. He is the Head and Professor of School of Chemistry and Biochemistry, Thapar University, Patiala, Punjab, a premier Engineering Institute of repute in North India. He has published 85 SCI research papers in American Chemical Society, Royal Society of Chemistry and Elsevier Science etc.

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