Noble Metal Nanoparticles Based Nanocomposite Materials For Sensing and Light Emitting Diode Applications

Dr. Jai Prakash received PhD in 2012 from India. He worked as a postdoctoral researcher at Aix-Marseille University (AMU), Marseille, France (2012-2013), Universite Libre de Bruxelles (ULB), Belgium (2013-2014) and University of the Free State (UFS), Bloemfontein, South Africa (2015-2016). He has been awarded as a senior research fellow and young scientist (fast track) by Council of Scientific and Industrial Research (CSIR) and Department of Science and Technology (DST), New Delhi (India) respectively. He has been invited as a guest scientist by NIMS, Japan in 2014. During his postdoctoral period at UFS, he worked on noble metal nanoparticles based nanocomposites for sensing and light emitting diode (LED) applications. He studied the optical properties of noble metal nanoparticles embedded within various matrixes such as polymers and metal-oxides etc. along with surface enhanced Raman scattering (SERS) effect of organic molecules. For examples: adsorption of methyl orange (MO) on the surface of Au nanoparticles formed on the polymer surface and embedded within the polymer surface by SERS nanotechnology (Figure 1). These Au nanoparticles were formed by low ion energy irradiation of thin Au film on polymer surface. He published 3 high impact research articles in journal of impact factor 7.8 (1) and 4.5 (2) while working at UFS and few more are under progress. Recently, he received the prestigious DST-INSPIRE faculty award (2015) by DST and joined as a INSPIRE faculty in Indian Institute of Technology (IIT) Kanpur (India), one of the premier research and higher technological institute in India. His field of interest in materials science includes, embedded noble metal nanoparticles in various matrices such as polymer, glass, metal oxides and polymer based nanocomposites for optical, sensing and LED applications. He has published more than 25 research articles in reputed journals.

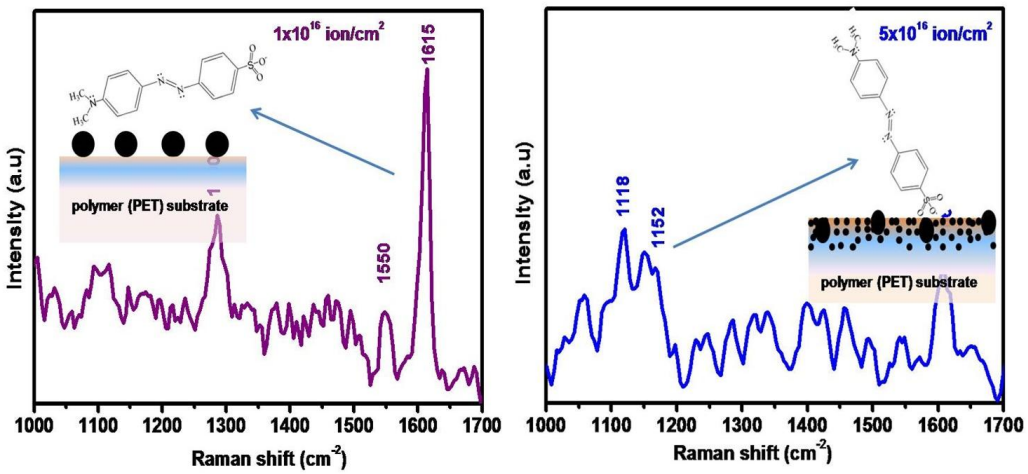

Figure 1: Different adsorption orientation of methyl orange dye molecules on Au-polymer SERS substrate (left) when Au NPS are on the surface (right) when Au NPs are embedded within the matrix. [Jai Prakash, V. Kumar, R. E. Kroon, K. Asokan, V. Rigato, K. H. Chae, S. Gautam and H. C. Swart, Optical and surface enhanced Raman scattering properties of Au nanoparticles embedded in and located on a carbonaceous matrix Phys. Chem. Chem. Phys, **18,** 2468-2480 (2016)]