Rare-Earth Doped Up-Conversion Nanophosphors for Solar Cell Applications

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I have joined the group of Prof. HC Swart in the Phosphors Research, University of the Free State, as a post-doctoral fellow. I did my PhD in Physics (Material Science) under the supervision of Prof. A S Dhaliwal in the Department of Physics, Sant Longowal Institute of Engineering & Technology, Distt. Sangrur, Punjab (India). My graduate research involved studying the effect of irradiation on the chemical, optical and structural properties of polymers. The work involved optimization of the process parameters for synthesis of metal conducting polymeric nano-composites and monitoring the effect of swift heavy ions on their properties by FTIR, UV-Visible, XRD, current-voltage characteristics and SEM. I am also synthesizing conducting hydrogels to be utilized for controlled drug delivery.

My current research interests are in Rare-Earth Doped Up-Conversion Nanomaterial's by utilizing the infrared region of solar radiation to improve solar cell performance. The objective this research is to develop novel nanophosphors, with an emphasis on their synthesis, characterization and their applications in solar cells and light emitting diodes. I am also involved in the synthesis of metal-oxide based nano-powders and thin films to improve their solid light emitting properties. I am eager to work in the field of up-conversions nanophosphor materials for solar cell applications.

Recently, our group contributed significantly to the field of development of novel light-emitting materials by synthesizing a purely organic phosphorescent material containing bis-pyrimidine skeleton for the first time. This finding could open the way for a new generation of materials for electronic displays and lighting, exploiting the relatively low cost and chemical versatility of systems based on bis-pyrimidine skeleton.

Research Publications:-

S. No.	*Type of Publication*	*No. of Publications*
1.	Paper Published/ Submitted in Journals	38
2.	Published/ Submitted in Conference Proceedings	05
h-index as per Scopus Database		**06**