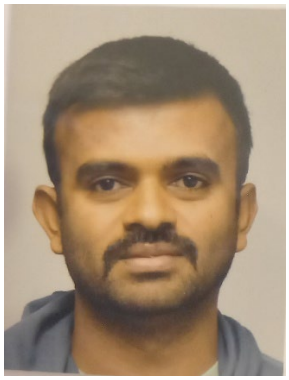
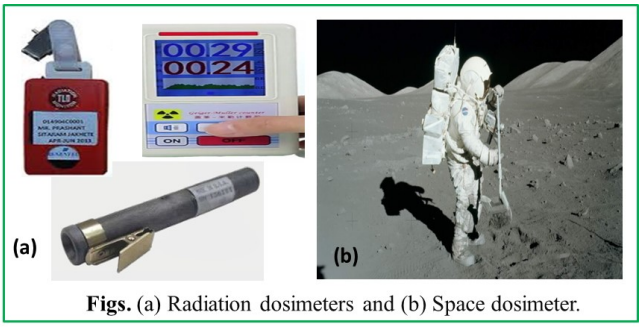
Luminescent materials for solar cell, display, and dosimetry applications



Shivaramu Nagarasanakote Jayaramu is working as a Post-doctorate fellow at Department of Physics, University of the Free State, Bloemfontein, South Africa. He has completed his Ph.D from Bangalore University, Bangalore, Karnataka, India, in 2016. And, he worked for a project on "Ionoluminescence studies of nanocrystalline oxides". He used heavy ions beam, gamma irradiation facilities to study the material modification, defects/damages in the materials, luminescence, dosimetry at Inter University Accelerator Centre (IUAC), New Delhi, India (2011-2016). He has been awarded as a Junior research fellow from University Grants Commission (UGC), India and he received best oral and posters awards from various National and International conferences. He has been awarded Travel support to attend International conference from Department of Science Technology (DST), Government of India (2015). He has published more than 32 research papers in International reputed Journals and presented his work in various National/International conferences/symposiums. His current research interests are in the development of nanostructures, nanocomposites, nanophosphors and thin films for optoelectronic, display, solar cell, radiation dosimetry and photocatalyst for water purification.

The field emission display (FED) technology is one of the important technological challenges for the flat screen market. Oxide materials are, therefore, very suitable for FED fabrication due to their high melting point, chemical and radiation stability, long lifetimes, and high color purity, and oxides do not react with an air atmosphere. Rare earth ions generally have excellent cathodoluminescent (CL) properties and have been used in a number of display technologies due to their excellent emissions based on their 4f–4f or 5d–4f transitions. Yttrium oxide (Y_2O_3) is a potential oxide host material due to its large bandgap, low phonon energy, and high thermal and chemical stability.

He worked on the gamma, beta, UV and heavy ion beam dosimetry properties of the yttria and aluminate-based materials by a thermally stimulated luminescence technique. Then improve the long persistent phosphors (LPPs) by co-dopant under the excitation of UV and blue light for an emergency lighting signs, dials display, luminous paints, children's toys, security displays, night-vision signage, in vivo bio-imaging, dosimetry and optical data storage.



Figs. (a) Radiation dosimeters and (b) Space dosimeter.