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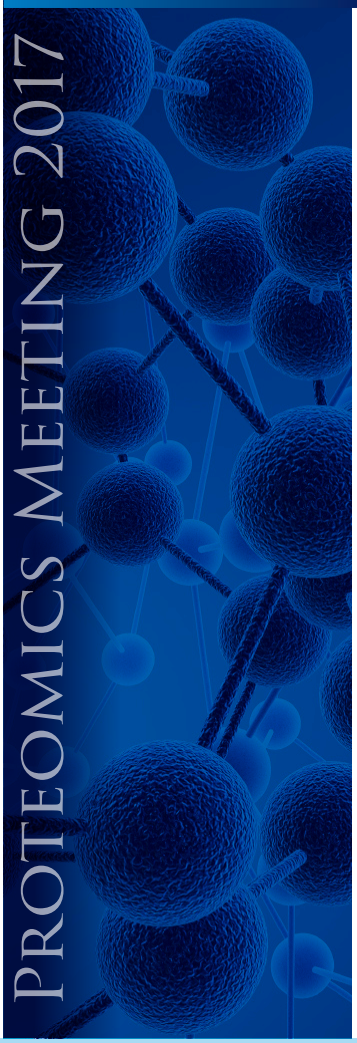

Luminescence in nanosized vanadate phosphor

Recently, rare earth doped vanadate phosphors have paid considerable attention owing to their long-wavelength excitation properties, which enable their use in LEDs, fluorescent lamps and flat panel displays. The luminescence performance of a material can be enhanced significantly by the suitable selection of host material. Since the white light-emitting diodes (WLEDs) gaining much more attention. Generation of the white light by combining an ultraviolet (UV) LED and appropriate phosphors is most desirable. Hence, it is essential to develop efficient phosphors to convert the near-UV pump light with a range of 300-400 nm into the visible wavelength. In order to fabricate excellent WLEDs, the excitation wavelength of the red phosphors should match the emission of the near UV-LEDs (350-410 nm) or blue LEDs (440-470 nm). Therefore, the phosphor materials play an important role in WLEDs. Most vanadates exhibit intense broadband emission from 400 nm to 700 nm under UV excitation because of tetrahedral VO4 with Td symmetry. The broadband emission spectra of vanadate phosphors are due to the charge transfer (CT) of an electron from the oxygen 2p orbital to the vacant 3d orbital of V^{5+} in tetrahedral VO_4 with Td symmetry. The luminescence is attributed to the $^3T_2 \rightarrow {}^1A_1$ and $^3T_1 \rightarrow {}^1A_1$ transitions. The preparation and photoluminescent properties of orthovanadate are M3−3x/2(VO4)2:xEu(0.01≤x≤0.09 for M=Ca and 0.03 for M=Sr and Ba) reported. The vanadate phosphors powder is synthesized using the solution combustion method. These phosphors are annealed at different temperatures and the impact of temperature is clearly seen on particle size. The particles become larger with increasing temperature and reach maximum at 1050, 1150 and 1250°C for Ca, Sr and Ba host, respectively. Eventually, the photoluminescence properties of these compounds under near UV-excitation are expected to make them applicable as efficient and novel luminescent materials for white light LED.

Biography

K N Shinde has completed his PhD from RTM Nagpur University, India and Postdoctoral studies in Nanotechnology and Advanced Materials Engineering, Sejong University, Seoul, South Korea. Presently, he is an Assistant Professor and the Director of R&D at N.S. Science and Arts College, India. He has published more than 50 papers in reputed journals and serving as an Editorial/Reviewer of international journals. His research interests are synthesis of nanocrystalline materials and exploring novel materials and study their PL properties. He has published a book entitled *Phosphate Phosphors for Solid State* Lighting with international publisher Springer series in material science. He is an active member of International Centre for Diffraction Data (ICDD), USA.

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