

Color Conversion Phosphors: Properties and Solid-State Lighting Applications

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Abstract—*The scientific community accepted 2015 as the International Year of Light and Light-Based Technologies because of the thrust of luminescent materials in every part of human expansion. Light-based technologies have transformed various sectors of science and technology. Notable research activities have been targeted to find cost-effective, environment-friendly, better-performance, and energy-efficient phosphor materials for application in solid-state lighting devices. The urge for luminescent materials with better optical and photoluminescence characteristics in many areas has led to research endeavors in this field intended to improve the material properties. In the past decades, much research interest has been focused on phosphors based on various inorganic and organic materials owing to their extensive applications in light-emitting diodes, cathode ray tubes, scintillation detectors, and biological technologies. The phosphors based on various inorganic and organic materials are highly conductive to release electric charges stored on the surface, and as a result; they have emerged as potential candidates for field emission display and plasma display panel devices. It is well known that rare earth (RE) ion-doped phosphor materials have been treated as efficient candidates for generating various emission wavelengths, which have many applications in solid-state lighting, display devices, etc. The emission of RE-doped phosphor at this particular wavelength range is because of the superb luminescence characteristics of the RE ions. This talk will cover the broad aspects of RE-doped oxide materials for tunable color emissions. Much of the material is drawn from personal experience in synthesizing, characterizing, and applying them for solid-state lighting.*