Spectral Engineering of Luminescent Phosphors for Display Applications

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Every information display device has light source and its performance is usually sensitive to this light source. For example, device efficiency, life time, brightness, and full color image are directly influenced by the scheme of light source. In case of consumer electronics such as LCD, PDP and even cellular phone, they used phosphors for light source. Therefore, it is very important to understand the optical, electrical, and chemical properties of phosphors for manufacturing the flat panel display. For display applications, the proper color purity has to be obtained for realizing full color images. The white color coordinates, which are obtained by combining R, G, B phosphors, are very sensitive to the emission spectrum from each R, G, B phosphor and a lot of effort has gone into development of phosphors with the proper emission and excitation condition. In this presentation, how the phosphor properties can be engineered for display application will be discussed. In particular, the effects of variation of crystal field resulting from changes in the host lattice are discussed for high efficiency. Also, the methodology to enhance the longevity of display performance will be presented.