Near UV excitable $Y_{2-x-y}Gd_ySiO_5:Ce_x$ white light emitting phosphors and their blends for white LED and displays

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Abstract

White light was realized due to Gd co-doping in Y_2SiO_5:Ce phosphor which is excitable under near UV light synthesized by solid state carbothermal reduction method. Y_2SiO_5 exists between two phase say, X_1 and X_2 in which X_1 form below 1190^{o}C whereas X_2 phase form above this temperature with space group $P2_1/c$ and B2/c respectively [1]. Y_2SiO_5: Ce emits blue light at 365nm excitation when Ce^{3+} occupies in the 1st site of Y. Gd^{3+} addition enhances emission intensity at 500 nm which broadens the spectrum towards higher wavelength due to occupation of Ce in the 2nd site of Y. Gd^{3+} and Ce^{3+} concentration was optimized to 0.5 and 0.08 in Y_2SiO_5 phosphor respectively. Fig.1 shows the comparison of emission spectra codoped with and without Gd in Y_2SiO_5:Ce phosphors. This phosphor blended with ZnS:Mn to enrich the CIE chromaticity values to realize better white light which is applicable to solid state lighting and devices.

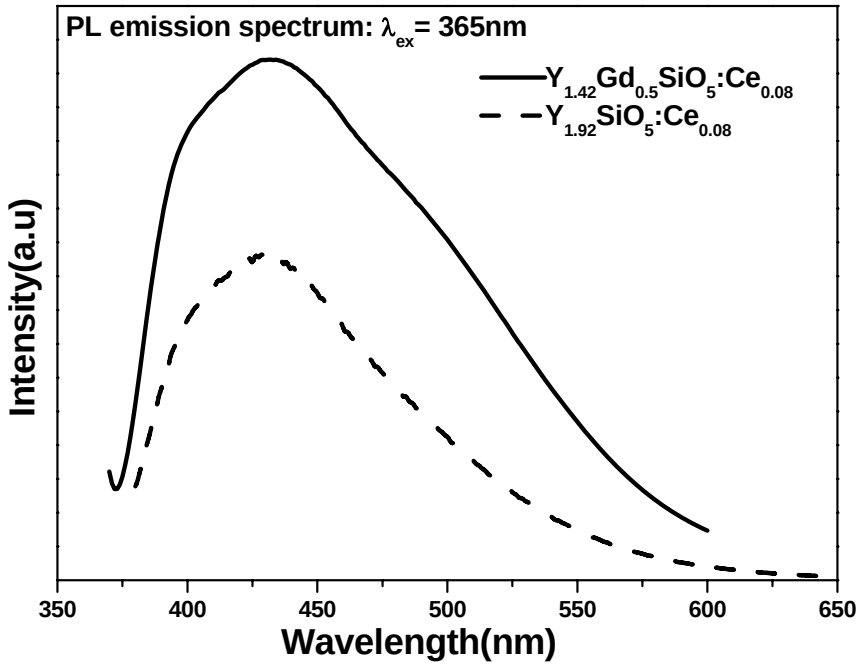

Figure 1. Comparison of emission spectra of Y_2SiO_5:Ce with and without Gd co doping

Reference:

1. J Felsche, *Struct.Bonding* (Berlin) **13**, 99 (1973)