

# LUMINESCENT ZNS:MN/THIOGLYCEROL AND ZNS:MN/ZNS CORE/SHELL NANOCRYSTALS:SYNTHESIS AND CHARACTERIZATION

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## TÓM TẮT:

The synthesis and photoluminescent properties of  $Mn^{2+}$ -doped ZnS nanocrystals coated with an organic shell of thioglycerol and an inorganic shell of ZnS are reported in this paper. The photoluminescence spectra of bare ZnS:Mn nanocrystals exhibited a dominant ultraviolet-violet emission peaked at the wavelength range of 395–450 nm and a weak orange emission peaked at the wavelength range of 580–600 nm. The ultraviolet-violet emission was attributed to the surface defect states. The orange emission was assigned to the  $4T_1-6A_1$  transition of  $Mn^{2+}$  ions. These two channels of radiative recombination compete with each other. The coating ZnS:Mn nanocrystals with the thioglycerol shells or the ZnS shells reduced the surface defects and led to the enhancement of the emission of  $Mn^{2+}$  ions. On the other hand, the overcoating ZnS:Mn nanocrystals by thioglycerol shell restricted the growth of the nanocrystals, while the overcoating ZnS:Mn nanocrystals by ZnS shells made the band edge of the ZnS:Mn/ZnS core/shell nanocrystals shift to the lower energy side (the red shift) compared with the bare ZnS:Mn nanocrystals as observed in both the absorption and the photoluminescence excitation spectra.