

Green Er^{III} luminescence in fractal ZnO nanolattices

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Abstract

Tetrahedral [Zn₄O(OAc)₆]-clusters grow in alcohol in the presence of Er^{III} and Si^{IV} ions to self-similar tetrahedral ZnO nanocrystals (with sizes $d = 5\text{--}6$ nm). The nanoparticulate ZnO films prepared from these colloids show green Er^{III} fluorescence. The Klafter–Blumen theory is used to fit the fluorescence decay data. From this fit, the donor life time τ_D and the exponent β were determined to be $\tau_D = 4.3 \mu\text{s}$ and $\beta = 0.289$, indicating that the interior space of the codoped ZnO nanocrystallites is fractal.