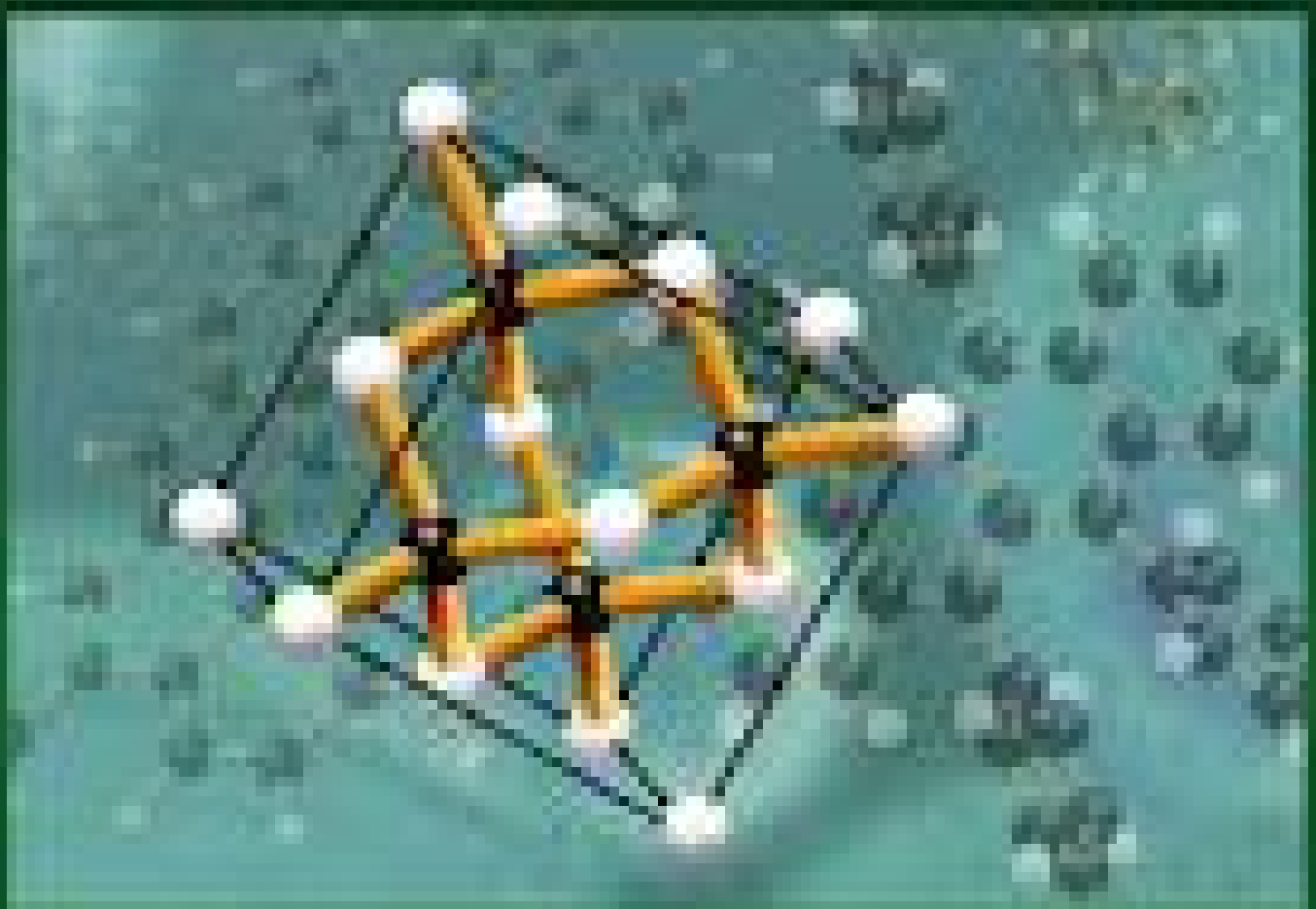


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# Luminescence and Thermal-Quenching Properties of Red-Emitting $\text{Ca}_2\text{Al}_2\text{SiO}_7:\text{Sm}^{3+}$ Phosphors

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## Abstract

$\text{Ca}_2\text{Al}_2\text{SiO}_7:x\text{Sm}^{3+}$  ( $x = 0.5, 1.0, 1.5, 2.0, 2.5,$  and  $3.5$  mol.%) ( $\text{CAS}:x\text{Sm}^{3+}$ ) phosphors were synthesized by a solid-state reaction technique. The structure, photoluminescence properties and thermal stability of phosphors were investigated in detail. Results of X-ray diffraction show that  $\text{CAS}:x\text{Sm}^{3+}$  materials have a single-phased tetragonal structure, and an expansion of the unit cell relates to the increasing of  $\text{Sm}^{3+}$  concentration. Photoluminescence study displayed that the  $\text{CAS}:x\text{Sm}^{3+}$  phosphors reach the highest emission intensity at 1.5 mol.%  $\text{Sm}^{3+}$  and achieved the luminescence quenching phenomenon a higher concentration. The dominant interaction mechanism of the concentration quenching process is determined due to