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# Enhanced green upconversion luminescence properties of $\text{Er}^{3+}/\text{Yb}^{3+}$ co-doped strontium gadolinium silicate oxyapatite phosphor

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## Abstract

Upconversion  $\text{Sr}_2(\text{Gd}_{0.98-x}\text{Er}_{0.02}\text{Yb}_x)_8\text{Si}_6\text{O}_{26}$  (SGSO:2 $\text{Er}^{3+}/x\text{Yb}^{3+}$ ) phosphor materials were synthesized using a citrate sol-gel process. X-ray diffraction patterns confirmed their hexagonal structures. Field emission scanning electron microscopy images of SGSO:2 $\text{Er}^{3+}/x\text{Yb}^{3+}$  phosphors depicted submicron particles. The enhanced upconversion luminescence properties of SGSO:2 $\text{Er}^{3+}/x\text{Yb}^{3+}$  phosphors were analysed as a function of  $\text{Yb}^{3+}$  ion concentration and laser power. The energy transfer induced enhanced emission of the  $\text{Er}^{3+}/\text{Yb}^{3+}$  ions co-doped SGSO phosphors was ascribed to multi-phonon relaxation. The

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