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Photoluminescence study of Nd³⁺-doped Si-rich silica films

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Keywords

Nd, Si, nanoclusters Si, energy transfer

Abstract

Nd³⁺-doped silicon-rich silicon oxide thin films have been fabricated by reactive magnetron co-sputtering of a pure silica target topped with Nd₂O₃ chips. The incorporation of silicon excess in the films has been controlled by the hydrogen partial pressure P_{H_2} introduced in the plasma. Photoluminescence experiments have been made at room temperature using a non resonant excitation with Nd³⁺ ions. The influences of Nd³⁺ content and P_{H_2} have been studied to improve the Nd³⁺ emission. Photoluminescence spectra reveal an enhancement of the Nd³⁺ emission at 0.9 μ m and 1.1 μ m when silicon nanoclusters and Nd³⁺ are embedded in a SiO₂ matrix.



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