

Photoluminescence characteristics of Er^{3+} and $\text{Er}^{3+}/\text{Yb}^{3+}$ co-doped heavy metal oxide glasses

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Abstract

This study reports Upconversion (UC) and Down conversion (DC) photoluminescence characteristics of Er^{3+} and $\text{Er}^{3+}/\text{Yb}^{3+}$ codoped heavy metal oxide glasses upon 980 nm diode laser excitation. These glasses were fabricated by melt-quenching technique and investigated their luminescence characteristics by varying codopant (Yb^{3+}) concentration. These glasses exhibit excellent emission at 1532 nm with luminescence intensity in several orders of magnitude higher than the up-conversion luminescence intensities. The addition of Yb^{3+} improves the absorption of the material at 980 nm significantly and also varying the concentration of Yb^{3+} the energy transfer mechanism evaluated. Also, spectroscopic characterisation including absorption, emission, and gain cross-section were carried out to demonstrate the potential use of the host material as a laser gain or C- band amplifier applications.