Structural and optical properties of erbium-doped willemite-based glass-ceramics

ABSTRACT

Willemite-based glass-ceramic was prepared from waste material using a conventional melt and quenching method. The crystalline willemite-based glass-ceramic was doped with Er2O3 (1-5 wt.%) followed by sintering at different temperatures (500°C-1100°C). Density and linear shrinkage were increased with the increase of the sintering temperature. Ultraviolet-visible spectroscopy (UV-Vis) confirmed an optimum optical absorption for sample doped with 3 wt.% of Er2O3 and sintered at 900°C. Photoluminescence measurements further confirmed 3 wt.% of Er2O3 as the optimum percentage of dopant. Results suggested that the obtained glass-ceramic could be a promising material for use as fiber amplifiers.