Er-Yb CO-DOPED SiO_2-P_2O_5 MONOLITHIC NANO - COMPOSITE SYNTHESIZED BY THE SOL GEL ROUTE

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ABSTRACT

Er-Yb CO-DOPED SiO_2-P_2O_5 MONOLITHIC NANO COMPOSITE SYNTHESIZED BY THE SOL-GEL ROUTE

A silica phosphate glass doped with Erbium and Ytterbium was produced by using sol-gel method. The sol-gel method is more preferred in synthesizing doped SiO_2-P_2O_5 as the method allows the bonding of the dopant in a molecular level, which conventional melt-quench method does not. Three samples were prepared, by which the constant variable is the Erbium doping concentration (in mol percent), and the manipulated variable is the Ytterbium doping concentration of 1, 2, and 3 mol percent. Analysis result from the Scanning Electron Microscope, SEM and the Fourier-Transform Infrared, FT-IR shows very promising result, proving that the heavy metal doping does appear on the surface of the glass. The IR spectrum on the other hand shows the physical structures of the SiO_2-P_2O_5 in their distinctive bandings and vibrations. However, all three samples suffered a serious case of cracking bordering shattering, which is due to the lack of proper climate control equipment necessary to control the room temperature which in this environment would accelerate the drying phase and thus preventing the SiO_2-P_2O_5 particle to cluster together fast enough as the particle separates itself from host material and other solvents as it dries.