Study of some physical properties of barium titana(batio3)doped with rare earth elements

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Pure and doped BaTiO3 (BT) with some rare earth ions such as Er+3 and Nd+3, and co-doped with Er+3- Yb+3 ions, with different concentrations in the form of powder and thin film, were prepared by sol gel method. XRD results confirm that the synthesized prepared samples crystallize into perovskite BaTiO3 phase when sintering at temperature of 750oC for one hour. The FTIR spectra of the prepared samples showed a broad band at 530 cm-1 which is typical for the Ti–O vibrations in BaTiO3. This absorption peak of Ti–O bond shifts to larger wavenumber with increasing the content of trivalent rare earth ions. Under 808 nm laser diode as excitation source, up-conversion of infrared to visible (Green and red luminescent emissions) in each of the powder and thin film doped samples were observed and investigated. A combination of two mechanisms such as excited state absorption (ESA) and energy transfer (ET) were used to explain the observed up-conversion emissions.