Study of structural and optical properties of CexZrl-x02 nanopowders synthesized through a sol-gel method in gelatin medium

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Abstract:

In this research, non-toxic CexZrl-x02 nanopowders (x = 0.0, 0.2, 0.4, 0.6, 0.8, 1.0) were synthesized at 600°C calcination temperature by a sol-gel method in a green rout, using gelatin. The starting materials were cerium nitrate, zirconium nitrate and gelatin, as the polymerization and stabilizer agent. The crystalline structure of the synthesized powders were investigated by X-ray diffraction (XRD) and The crystallite size of the prepared samples were estimated using Scherrer formula and also the size-strain plot (SSP) method and were found in the range of about 4-12 nm. The TEM images of the cerium oxide and zirconium oxide revealed that the average particle size of the powders are about 12 nm and 9 nm, respectively. The optical properties of the nanopowders were studied by UV-Vis diffused spectroscopy. The optical band gaps of the samples were calculated by Kubelka-Mank method.

Keywords:CexZrl-x02, Nanopowder, Sol-gel