

عنوان مقاله:

Structural, Luminescence, and Anti-Bacterial Properties of CdWO₄: Ag Nanopowders

محل انتشار:

دومین کنفرانس بین المللی دانشجویان علوم پایه ایران (سال: 1402)

تعداد صفحات اصل مقاله: 16

نویسندگان:

Nooshin Heydarian Dehkordi - Ph.D. graduate of nanotechnology from Semnan University, Semnan, Iran

Morteza Raeisi - Department of Physics, Faculty of Science, Shahrekord University, Shahrekord, Iran
Nanotechnology Research Institute, Shahrekord University, Shahrekord, Iran

Sanaz Alamdari - Ph.D. graduate of nanotechnology from Semnan University, Semnan, Iran

خلاصه مقاله:

Considering the wide application of tungstate compounds in optoelectronics, the optical capabilities of noble metal nanoparticles (NPs), and the problems of the crystal growth process, in this research, CdWO₄ (CWO) and Ag-doped CWO (Ag: CWO) nanopowders were synthesized by the easy, quick, and cost-effective method of the co-precipitation. The structural and optical properties of prepared nanopowders were investigated thoroughly. XRD results verified the production of both nanopowders with monoclinic (wolframite) crystal structures. The lattice parameters, crystallite size, and lattice strain of CWO and CWO: Ag nanopowders were compared by Rietveld refinement and Williamson-Hall (W-H) analysis. Ag dopant exhibited its presence through the decrease in the intensity of the vibrational mode of ν_1 (Ag) at 896 cm^{-1} in the CWO: Ag Raman spectrum. FE-SEM and TEM images showed that Ag ions increased the size of CWO NPs and introduced some nanorods with a diameter of approximately 29 nm . Photoluminescence (PL) measurements in 2 excitation wavelengths and Ion Beam-Induced Luminescence (IBIL) results revealed that the shallow level of Ag⁺ dopant near the conduction band of WO₆ enhanced its luminescence properties under UV ($\lambda_{exc}=280\text{ nm}$) and ion beam ($E=2.2\text{ MeV}$) excitations. Antibacterial analyses revealed that CWO: Ag nanopowders deleted more than 99.9% of Gram-negative bacteria Escherichia coli (E. coli) in 6 hours. Based on the results, CWO: Ag nanopowder has great potential in laser technologies, spectroscopy, medicine, and E. coli sensors.

کلمات کلیدی:

Antibacterial analyses, Ag-doped CWO, Nanorod, Rietveld refinement, Luminescence

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1943236>

