



Iranian Journal of Physics Research, Vol. 20, No. 4, 2021
DOI: 10.47176/ijpr.20.4.38211

A new method for the synthesis of PbO nano-rods and its application in ionizing radiation shielding

S Yazdani Darki¹, M Eslami-Kalantari¹, and H Zare²

1. Nuclear Physics Division, Physics Department, University of Yazd, Yazd, Iran
2. Solid State Physics Division, Physics Department, University of Yazd, Yazd, Iran

E-mail: meslami@yazd.ac.ir

(Received 25 June 2019 ; in final form 04 October 2020)

Abstract

We successfully synthesized PbO nanorods by a simple and low-cost approach using $\text{Pb}(\text{CH}_3\text{COO})_2 \cdot 3\text{H}_2\text{O}$, NaOH as the starting materials without any surfactants in water media at room temperature. Scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), x-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), ultraviolet–visible spectroscopy (UV–Vis), and photoluminescence spectrophotometer (PL) were used to characterize the samples. The prepared nanorods had the average diameter of about 40 nm, the average length of about 6 μm and the average crystallite size of about 57 nm. PbO nanorods showed good gamma and beta attenuation; so, they could be considered as a potential candidate for radiation shielding.

Keywords: PbO, nanorod, nanomaterial, chemical synthesis, radiation shielding

For full article, refer to the Persian section