




# Determination of structural features of different Perovskite ceramics and investigation of ionizing radiation shielding properties

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## ABSTRACT

Recently, the use of ionizing radiation in various fields leads to an increased demand for shielding materials. This work aims to study the structural and radiation shielding properties of two groups of perovskite ceramics. Fourier transform infrared and X-ray diffraction were utilized to investigate current samples' structure, and various radiation shielding parameters were determined to explore the current samples' ability to absorb radiation within an energy range from 0.284 to 2.506 MeV using the Phy-X program. The Fourier transform infrared results revealed one vibration band for BaTiO<sub>3</sub>-ZrO<sub>2</sub> located at 507 cm<sup>-1</sup>, two bands centered at 835 and 520 cm<sup>-1</sup> for the BaTiO<sub>3</sub>-Mo sample, and five bands located at 435, 520, 539, 615, and 775 cm<sup>-1</sup> for SrMnO<sub>3</sub>-ZnO and SrMnO<sub>3</sub>-TeO<sub>2</sub>. Simultaneously, the X-ray diffraction displays the hexagonal phase for SrMnO<sub>3</sub> and the tetragonal phase for BaTiO<sub>3</sub> samples. The BaTiO<sub>3</sub>-Mo sample has the highest density, packing density, and Poisson's ratio compares with other samples. According to gamma shielding results, the SrMnO<sub>3</sub>-ZnO and BaTiO<sub>3</sub>-ZrO<sub>2</sub> samples appear the lowest and highest absorption ability, respectively. On another side, the SrMnO<sub>3</sub>-TeO<sub>2</sub> sample has the highest removal cross-section for fast neutrons. From obtained results, it can be concluded that

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