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A Study of Alpha Particles Effects with Different Energies on the Optical Properties of LR115 Detector by Using Spectrophotometer

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Abstract

The optical properties of solid state nuclear track detectors (LR115) films are studied. The detectors (LR115) films have been irradiated with Alpha particles of different energy ($E_{\alpha} = 1, 2, 3, 4, 5$ MeV). The optical properties are studied (for pristine and irradiated films) by using measurements from ultraviolet-visible (UV/VIS) spectrophotometer at wavelengths within the range (600-1000 nm). The optical results show that the absorption of (LR115) films are increased with increase irradiation (energy of alpha particles). The optical constants are calculated before and after irradiation. Also the values of the optical energy band gaps for (LR115) films, which was non-irradiated with direct and indirect influence, has been found (2.145, 1.89 eV) respectively. Whereas the values of direct and indirect optical energy gaps after irradiated with α -particles (2.02, 1.75 eV) respectively.

From these results, we can reveal that the values of energy band gaps in a direct-coincidence before and after irradiation are greater than that for indirect one.

Keywords: Optical band energy; LR115 detector; alpha irradiation; UV/VIS Spectroscopy; optical properties.