

عنوان مقاله:

Effect of Gamma Radiation on The Physical Properties and Performance of Titanium Dioxide Microparticles as Resistive Humidity Sensor

محل انتشار:

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خلاصه مقاله:

In this study, the effect of gamma radiation on the performance of titanium dioxide microparticles as a moisture-sensitive material in a resistive humidity sensor was investigated under zero, ۱.۳۴, ۲.۶۹, and ۵.۰۴ Gy doses. The TiO<sub>2</sub> microparticles were deposited on the Interdigitated Electrode (IDE) using the Dr. Blade method. Samples were irradiated using (۲۴۱AM) with an activity of ۹.۶۵ mCi as a gamma source. The structural changes were analyzed before and after irradiation by X-ray diffraction (XRD). Based on the results obtained, it was found that first the electrical resistance (R) of the sensor increases under the dose of ۱.۳۴ Gy in the medium humidity range. Then, during irradiation under doses of ۲.۶۹ and ۵.۰۴ Gy, the resistance gradually decreases and stabilizes at a level close to the initial value before irradiation. The data obtained from the XRD results also show changes in particle size that are consistent with the sensor test results. The current study indicates that the functional sensitivity of the sensor to gamma radiation can be eliminated by exposing it to a dose of about ۵.۰۴ Gy and making it hard against radiation. This phenomenon can be useful in applications that need to measure humidity in environments exposed to gamma radiation.

کلمات کلیدی:

Resistive Humidity Sensor, Titanium Dioxide Microparticles, Gamma Radiation, Radiation Effects, Radiation Hardening

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