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Alternative of Lead-Based Ionization Radiation Shielding Property: Epoxy-Based Composite Design

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Abstract : The practice of radiation shielding protects against the detrimental effects of ionizing radiation. Radiation shielding depletes radiation by inserting a shield of absorbing material between any radioactive source. It is a primary concern when building several industrial fields, so using potent (high activity) radioisotopes in food preservation, cancer treatment, and particle accelerator facilities is significant. Radiation shielding is essential for radiation-emitting equipment users to reduce or mitigate radiation damage. Polymer composites (especially epoxy based) with high atomic number fillers can replace toxic Lead in ionizing radiation shielding applications because of their excellent mechanical properties, superior solvent and chemical resistance, good dimensional stability, adhesive, and less toxic. Due to being lightweight, good neutron shielding ability in almost the same order as concrete, epoxy-based radiation shielding can be the next big thing. Micro and nano-particles for the epoxy resin increase the epoxy matrix's radiation shielding property. Shielding is required to protect users of such facilities from ionizing radiation as recently, and considerable attention has been paid to polymeric composites as a radiation shielding material. This research will examine the radiation shielding performance of epoxy-based nano-WO3 reinforced composites, exploring the performance of epoxy-based nano-WO3 reinforced composites. The samples will be prepared using the direct pouring method to block radiation. The practice of radiation shielding protects against the detrimental effects of ionizing radiation.

Keywords : radiation shielding materials, ionizing radiation, epoxy resin, Tungsten oxide, polymer composites
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