

Title: Effect of concentration of CuO on radiation shielding characteristics of Epoxy-resin materials

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Abstract: In this work, a new composite based on [epoxy resin](#) impeded with both micro and nano size of [copper oxide](#) (CuO) for photon shielding application were investigated. Four Epoxy-CuO composites were prepared including pure Epoxy [resin material](#), EP-10%CuO_m (90% Epoxy +10% CuO-MPs), EP-30%CuO_m (70% Epoxy +30% CuO-MPs) and EP-50%CuO_m (50% Epoxy +10% CuO-MPs). The same composites were prepared with CuO-nanoparticles (EP-10%CuO_n, EP-30%CuO_n and EP-50%CuO_n) as well as three other composites with micro and nano together (EP-10%CuO_{m+n}, EP-30%CuO_{m+n} and EP-50%CuO_{m+n}). The linear [attenuation coefficient](#) (LAC) was found via the narrow beam technique employing HPGe (high pure Ge) detector at different abroad energies from 0.060 to 1.333 MeV. Comparison of the experimental values with those of micro composites obtained from XCOM software revealed a good agreement. Additional [attenuator](#) parameters (half and tenth value layers, [mean free path](#), and transmission factor) have been calculated. The results approved that the composites with varying weight percent of mixture of nano and [micro particles](#) of CuO have higher attenuation preference than composites with nano and [micro particles](#), separately at all discussed energies. It was observed that the attenuation preference of EP-50%CuO > EP-30%CuO > EP-10%CuO > Pure Epoxy, in addition to, the LAC of EP-50%CuO_{m+n} > EP-50%CuO_n > EP-50%CuO_m.

Keywords: Epoxy resin; Copper oxide (CuO); Micro- and nanoparticles; Photon shielding; Linear attenuation coefficient (LAC);

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