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Energy dependence of radiation interaction parameters of some organic compounds

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Abstract

Gamma rays interact with a material through photoelectric absorption, Compton scattering, Rayleigh scattering and Pair production in the intermediate energy range. The probability of occurrence of a particular type of process depends on the energy of incident gamma rays, atomic number of the material, scattering angle and geometrical conditions. Various radiological parameters for organic compounds, namely ethylene glycol (C₂H₆O₂), propylene glycol (C₃H₈O₂), glycerin (C₃H₈O₃), isoamyl alcohol (C₅H₁₂O), butanone (C₄H₈O), acetophenone (C₈H₈O₂), cyclohexanone (C₆H₁₀O), furfural (C₅H₄O₂), benzaldehyde (C₇H₆O), cinnamaldehyde (C₉H₈O), glutaraldehyde (C₅H₈O₂), aniline (C₆H₇N), benzyl amine (C₆H₇N), nitrobenzene (C₆H₅NO₂), ethyl benzene (C₈H₁₀), ethyl formate (C₃H₆O₂) and water (H₂O) are presented at 81, 122, 356 and 511 keV energies employing NaI(Tl) scintillation detector in narrow-beam transmission geometry. The radiation interaction parameters such as mass attenuation, molar extinction and mass energy absorption coefficients, half value layer, total atomic and effective electronic cross-sections and CT number have been evaluated for these organic compounds. The

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