Calculation of Absorption Parameters for Selected Narcotic Drugs in the Energy Range from 1 keV to 100 GeV

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ABSTRACT

The total mass attenuation coefficients (μ/ρ), total molecular ($\sigma_{t,m}$), atomic ($\sigma_{t,a}$) and electronic ($\sigma_{t,e}$) cross sections, effective atomic numbers (Z_{eff}) and electron density (N_E) were computed in the wide energy region from 1 keV to 100 GeV for the selected narcotic drugs such as morphine, heroin, cocaine, ecstasy and cannabis. The changes of μ/ρ, $\sigma_{t,m}$, $\sigma_{t,a}$, $\sigma_{t,e}$, Z_{eff} and N_E with photon energy for total photon interaction shows the dominance of different interaction process in different energy regions. The variations of μ/ρ, $\sigma_{t,m}$, $\sigma_{t,a}$, $\sigma_{t,e}$, Z_{eff} and N_E depend on the atom number, photon energy and chemical composition of narcotic drugs. Also, these parameters change with number of elements, the range of atomic numbers in narcotic drugs and total molecular weight. These data can be useful in the field of forensic sciences and medical diagnostic.

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