

Aerosols handbook: Measurement, dosimetry, and health effects

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Aerosols consist of particles in the very broad range of sizes from nanometers to hundreds of micrometers (4 to 5 orders of magnitude). Therefore, their behavior is complicated in the atmosphere, indoor and especially in the lung. Health effect associated with aerosols depend on the physical parameter that we call "dose". Dose depends on the quality of aerosols in target cells. With the exception of some radioactive aerosols, it is practically impossible to measure dose directly. In practice, assessment of the dose is provided by measuring air concentration and calculating some known parameters. During the past years, nanotechnology industries have grown rapidly with federal and state initiatives, and these promise substantial economic benefits. Aerosols can affect both global climate and, when inhaled, human health. The USEPA assessment of benefits to human health Clean Air Act attributed 90% of the estimated benefits to reduction in particular matter during 1900-2100. The human effects associated with aerosols depend on local deposition of the particles in lung. Radioactive aerosols are of interest because their deposition in the lung can be determined in order to estimate radiation dose and subsequent health effects.

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