



Active Sampling Device for Estimating Total Aerosol Deposition in the Human Respiratory Tract

There is vast epidemiological and toxicological evidence associating particulate matter exposure with disease. Unprotected individuals who are exposed to a hazardous aerosol will intake a fraction by inhalation, which then leads to a dose and may ultimately cause an adverse health effect. The better a measurement represents the actual dose received, the more accurate the estimate of health effect will be. Additionally, inhaled therapeutics require similar measurements to accurately dose and test for efficacy during clinical trials.

In recognition of the need to estimate respiratory dose CSU researchers have developed a device and method to estimate particle intake (i.e. penetration) into the respiratory tract. Penetration-based samplers represent the current state-of-the-art in personal aerosol sampling, but they often misrepresent the amount of aerosol actually deposited within the lung. This invention generates aerosol penetration data for various porous foams, as a function of particle size, and models the penetration as a function of foam physical properties, incorporating a diffusive deposition term.

Features and Benefits

- Device models the human lung to accurately calculate the deposition of an aerosol
- Significant improvements over current filter capture methods
- Deposition of aerosol is a better measure than exposure when accurately assessing the potential effects of an inhaled substance
- Potential uses in therapeutic inhalation trials and also measuring exposure to toxins

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Publications

Journal of Aerospace
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