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CHARGE EFFECTS ON PARTICLE DEPOSITION IN THE HUMAN TRACHEOBRONCHIAL TREE

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Electrification occurs in most aerosol generating processes. The unipolar charges carried by these particles can influence the deposition of inhaled particles in the lungs. Recently published studies using a hollow lung cast of a human larynx-tracheobronchial tree and *in vivo* experiments in human subjects have demonstrated that increased deposition was due to electrostatic charges on the particle. The electrostatic charge effect on deposition may be important in the assessment of hazards associated with charged particles and was therefore studied theoretically. A new model was developed to predict particle deposition in the bronchial airways due to the combined mechanisms of inertial and electrostatic image forces. The agreement between the predicted values and the experimental data suggests that the new theory can be used to estimate tracheobronchial deposition of charged particles in the human respiratory tract.

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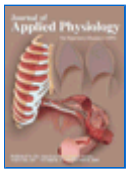

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