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Numerical Analysis on Size Dependency of Particulate Matter Behavior in Electric Collector YOSUKE SATO, AKIO UI, Mechanical Systems Laboratory, Corporate Research and Development Center, Toshiba Corporation, 1 Komukai-Toshiba-Cho, Saiwai-ku, Kawasaki 212-8582 — Recently the adverse effect of particulate matter having aerodynamic diameters (AD) of less than 2.5μm (PM2.5) on the human body has been attracted a lot of attention and it is expected to increase concerns about the effect of smaller particles, namely particulate matter having AD of less than 0.1μm (PM0.1). For air purifiers it is important to have the ability of efficiently collecting these particulate matters. In this work attention is paid to a plasma electric collector which utilizes Coulomb's force and is suitable to collect relatively small particles. Numerical simulations of plasma characteristics including two charging mechanism and tracking of charged particles are used to evaluate charging and collecting properties of the particles. Charge number attached on each particle decreased with decreasing AD and the number attached on each 0.1μm particle is one-by-hundredth to that of 2.5μm particle. However, the results of simulation on tracking of charged particles show that the collecting efficiency of 0.1μm particles is higher than that of 2.5μm particles. This is expected due to the fact that the dependencies of external forces (Coulomb's, gravitational and aerodynamic drag) on the AD differ from each other. Detail results will be shown during presentation.

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