A Modeling of Electrostatic Charging of Particles in a Shaker with DEM

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***Abstract*— A modeling of particle motion and electrostatic charging of particle are being tried with using DEM (Discrete Element Method). As a targeted model experiment, charging of particles in a shaker was applied. In the experiment, a certain number of spherical plastic particles in 3 mm in diameter is loaded in a metal cubic container, then shaken. After a certain time, all particles are poured into a Faraday-cage and the amount of charge is measured. To model this, electrostatic functions as (1) charge generation, (2) long range interaction, (3) boundary condition of the container, and (4) space charge effect are implemented. As the charge generation model, a simple linear relationship between the impact charge (net charge transfer) and particle charge before impact was adopted for particle-wall contact, whilst particle to particle charge transfer was neglected so far. The simulation showed good agreement with the experimental results, especially in the terms of the space charge effect, in which the external electric field coming from the other particles and boundary affects the charge transfer on a particle in contact with the wall.**