

Video on Particle Agglomeration and Levitation for "Agglomeration and Dispersion Related to Particle Charging in Electric Fields" Published in KONA Powder and Particle Journal, 2021, No.38, 82-93

***Title of Manuscript**

Agglomeration and Dispersion Related to Particle Charging in Electric Fields

***Keywords**

particle, electric field, charging, agglomeration, levitation, dispersion

***Data Description**

This video demonstrates particle agglomeration and levitation occurring in a parallel electrode system consisting of an upper mesh electrode and a lower plate electrode. Particle layers were placed on the plate electrode. The particles on the top surface of the particle layers were charged through induction in a strong electric field even though the particles were dielectric. These particles were also polarized, and they formed straight-chain agglomerates on the particle layers through mutual electrostatic interactions. Single particles and agglomerates were levitated by Coulomb forces. When the charge of the single particles was low, the particles did not levitate. However, when the magnitude of the total Coulomb force of the constituent primary particles was high, the agglomerates levitated. The specific charge of the levitated agglomerates decreases with an increase in the number of primary particles in the agglomerates.

Experimental conditions

Particles: glass beads, 100 μm in mass median diameter

Distance between electrodes: 10 mm

Voltage applied to lower electrode: 5 kV

Voltage applied to upper electrode: 0

Room temperature: $22 \pm 2^\circ\text{C}$

Relative humidity: $50 \pm 2\%$

Nomenclature

D_{p50} : mass median diameter of particle

V_L : voltage applied to lower electrode

V_U : voltage applied to upper electrode

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***Contact**

Prof. Shuji Matsusaka

matsu@cheme.kyoto-u.ac.jp