

Video on Continuous Particle Feed and Dispersion 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**

continuous particle feed, vibration, electric field, charging, levitation, dispersion

***Data Description**

In powder handling processes, continuous feeding and control of particle motion are essential for the stable operation and quality control of products. A novel system was designed to satisfy the requirements by using both parallel electrodes and a vibrator. This video demonstrates the behavior of particles observed in this system. A mesh electrode was placed at a distance of 20 mm from the plate electrode on an inclined dielectric base. The particles were fed at a constant flow rate and transported on the lower electrode, which was vibrated to improve particle flow. The particles charged through induction were levitated by Coulomb forces and dispersed by their mutual electrostatic repulsion. Particle motion could be controlled by the electric field strength and direction. The spread area of the particles increased with an increase in the absolute value of the applied voltage.

Experimental conditions

Particles: alumina, 48 μm in mass median diameter

Particle mass flow rate: 20 mg/s

Distance between electrodes: 20 mm

Voltage applied to lower electrode: 8 kV

Voltage applied to upper electrode: 0

Room temperature: $25 \pm 5^\circ\text{C}$

Relative humidity: $45 \pm 5\%$

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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