

Triboelectric Charging through Particle-particle Interactions of Polydisperse Granular Systems

Mihai A. Bilici, Joseph R. Toth, R. Mohan Sankaran, Daniel J. Lacks
Case Western Reserve University, USA
e-mail: joseph.r.toth@case.edu

Abstract— Triboelectric charging is a poorly understood process. From past experiments there is evidence that in interactions of particles of the same chemical composition and different sizes, the larger particles charge positively and the smaller particles charge negatively. We have developed a method where particles exchange charge by contacting other particles only. Our process uses a bed of particles with an air stream blowing up through the center forming a fountain where particles interact and tribocharge. After charging the particles for a period of time, they are sent down between the electrodes of a free-fall separator in a zone of high intensity electrical field. The charged particles are deviated towards the electrodes and collected in five containers placed underneath. By examining the size distribution in the containers we determined that larger particles were deviated more towards the negative electrode and smaller particles towards the positive electrode.