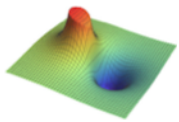
Proceedings of STEP-V
The virtual symposium on Static-Tribo-Electricity of Powder



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Charge Generation by Evaporation Observed on the Microscopic Scale

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Many aspects of electrostatic charge remain poorly understood, especially in regards to how humidity effects surface charge. Kelvin Force Microscopy (KFM) has allowed for the examination of surface potentials at the microscopic scale, showing that surface potential is usually composed of positive and negative domains. We have created an experiment where an interdigitated electrode (IDE) is exposed to ethanol while under various different potential biases. We have found that the evaporation of liquids leaves behind a charge on the insulating section of the IDE. Additionally, removing the bias allowed us to see that the charge left behind by the ethanol can be superimposed on the surface potential before ethanol application to create a pattern that matches the imposed local electrostatic potential. This means that the surface potential of an insulator can determine the polarity and magnitude of charge absorbed from a liquid during evaporation. In most environments, water is constantly precipitating and evaporating from surfaces, so this phenomenon may explain how changes in humidity can affect the surface potential of an insulator.