Abstract Submitted
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Ultra-Concentration and Microjet Ejection of Charges by AC Tangential Charging at the Poles of Conducting Granules[1] HSUEH-CHIA CHANG, University of Notre Dame, USA, SHAU-CHUN WANG, National Chung Cheng University, Taiwan, HSIEN-HUNG WEI, National Cheng Kung University, Taiwan — Counter-ions charged into the extended double layer of a conducting granule of size a by an AC field E is shown by fluorescent imaging to migrate tangentially towards the pole in each half cycle if Γ=(EaF/RT) is large. The charges accumulate at the pole and extend the local double layer thickness to a macroscopic value $a/\sqrt{\Gamma}$. The accumulated charges reach a concentration more than a million times, estimated to be the Boltzmann factor e^{Γ}, higher than the bulk value before being discharged in a dramatic microjet ejection event. The pole charging time can be estimated by the electro-migration time around the granule, which is (1/ Γ) times the diffusion time a^2/D, and ejection can be prevented if the frequency is below the inverse charging time. The microjet is shown to be confined by the field lines bounding the extended double layer at the pole and reaches a distance five times its thickness. Implication of this intense particle dipole formation on dielectrophoresis and alpha impedance relaxation will be discussed

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