

**Summit to: (CMC)**

## **Monte Carlo method study on Charging effect**

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**EXTENDED ABSTRACT:** Charging effect is an important phenomenon in electron-beam based experimental techniques, this effect can be encountered in the characterizations for insulating materials. It may influence the experimental results that cover the intrinsic property of materials, which makes it difficult to measure the morphology of insulator materials. Complex physical processes contribute to charging effect, such as charge transport, charge trapping and charge screening. Monte Carlo is an effective method to study the charging effect of insulating materials induced by electron beam irradiation. To construct complicated geometry, the finite triangle mesh method is used to cover the surface of materials. The Mott cross section is used to describe electron elastic scattering, and to describe electron inelastic scattering, we have to use Lindhard dielectric function [1]. Once the energy of electron is below the cutoff energy, these energy-exhausted electrons would drift under the electric field until they are trapped. To simulate the electric field, the spatial potential distribution must be developed by considering the spatial distribution of electron and holes, therefore, a self-consistent method was developed for calculating this problem [2]. Meanwhile, charging effect is proposed and demonstrated in detail with support of manipulation of nano-scale material in liquid cell by means of vortex electron beam.

**Keywords:** Monte Carlo; charging effect; manipulation of nano material; ...

### **REFERENCES**

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### **BIOGRAPHY**



Z.H. Min is studying his doctor's degree in University of Science and Technology of China from 2020, with the help of professor Ding.

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