



Alteration of Glass Grains Under Electron Bombardment

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Dust grains are widely spread across the solar system. Lots of them have silica or glass-like composition (e.g., Lunar regolith). Since the grains could easily become charged within the space plasma and radiation environment, charging properties of such materials appear important. We have observed that heavy electron bombardment could alter the surface properties (most probably not only structure but also the composition or stoichiometry of the surface). Such a behavior could result in several features including (a) intense sputtering when complemented with electron bombardment and thus destruction of the grain, (b) fast production of neutrals and pick-up ions, (c) changes in grains albedo and its surface conductivity, etc. This paper presents a series of laboratory observations on spherical glass grains that are levitated in the quadrupole trap and exposed to the particle beam(s). A temporal evolution of the grain charge-to-mass is recorded in course of charging/discharging processes and changes in grain mass and emission properties are estimated. Particular characteristics are compared with the Monte-Carlo model of secondary emission.