Geophysical Research Abstracts,
Vol. 11, EGU2009-7411-1, 2009
EGU General Assembly 2009
© Author(s) 2009

Low-energy secondary electron spectra on a-C grains

M. Beránek, I. Richterová, Z. Němeček, and J. Šafránková

Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic (martin.beranek@mff.cuni.cz)

Dust grains in the space plasma are charged by various processes; among them, secondary emission induced by impacts of energetic electrons is of principal importance. A low-energy part of secondary electron spectra determines an equilibrium potential of the grain exposed to electron bombardment. The spectra are formed as a product of the secondary electron flow inside the grain hitting the surface and the transmission function of the surface. We study properties of the micron-sized amorphous carbon grain captured in the electrodynamic quadrupole trap. We have observed an increase of the secondary electron yield induced by a surface electric field. Without the electric field applied, only the secondary electrons having an energy above the work function are able to leave the surface. Consequently, an increase of the surface field increases the surface transmission probability for a narrow range of electron energies. The actual value of the energy depends on the applied electric field and is lower than the work function. Therefore, the measured yield increase is related to the number of electrons hitting the surface with this energy. Using this method, we determine the spectra of secondary electrons approaching the surface with energies slightly less than the work function of the material. These electrons cannot form the field-free spectra but the results can be compared with predictions of models.