



Dynamics of charged micrometeoroids entering the Earth's atmosphere

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In this work we present a consistent theoretical model in order to study the electrical charging, deceleration, heating, ablation, and sputtering of a low work function micrometeoroid entering the Earth's atmosphere.

In the model we have calculated the production rate of electrons along the meteoroid's path considering both the ionization generated by collisions and the background molecules in the atmosphere.

We have simultaneously solved the equations of continuity of charge, mass, momentum and energy in order to study the micrometeoroids dynamics and the results show these tiny bodies can have different charge polarities with small negative potential during their paths for all analyzed cases. Particularly for 100 and 40 micron-sized bodies, we have found some differences between thermionic emission of electrons and electron production associated with ablation. With regard to sputtering rate there are also some differences although they are small when we compare the sputtering rate for these both sizes.