Dust grains coexist with plasma of various parameters in space as well as in laboratories and industrial facilities. The mutual interaction of plasma particles with dust grains leads to their charging. An equilibrium grain charge depends on plasma environment as well as on the grain composition, size, shape, and history. A precise estimation of an equilibrium grain charge in specific plasma conditions can be thus complicated.

We present preliminary results of a new numerical method for calculation of a charge of the grain immersed in the plasma with focus on environments where secondary electron emission by energetic electrons dominates. Although our aim is to use this method for estimation of the equilibrium charge of dust in space, we handled with spherical glass grains of different sizes for this initial study. The reasons are: (1) there is enough data on the secondary emission from laboratory experiments, (2) well defined geometry of a particular grain, and (3) the glass resembles the composition of a typical space dust. The main difference of our calculations and already published estimations is that we apply a modified model of the secondary electron emission for dust grains by Richterová et al. [1] which takes into account an influence of grain size, material, and surface roughness. Since this model describes the increase of the secondary emission yield caused by a finite dimension of the dust grain, our calculations provide a more realistic estimation of the dust grain charge in hot environments.