ION ACCUMULATION BY DUST CLOUD IN DC DISCHARGE

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The ion accumulation within the negatively charged dust cloud embedded in a plasma of dc glow discharge have been studied numerically in conditions corresponding to recent experiments [1]. The characteristics of neon plasma in positive column of dc discharge with various concentrations of micron-sized particles have been simulated employing a diffusion-driftt model with use of experimental values of parameters of dust clouds [2–4]. The model considers an additional gas heating associated with the presence of dust component. It has been shown that the injection of dust particles into a plasma can either reduce the concentration of ions due to their recombination on dust particles or increase it due to formation of ion concentrator. Conditions, under which the plasma-dust cloud represents an ion concentrator, have been found; the concentration of ions in this trap can be several times higher than that in a discharge without dust particles.

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1. Shumova V.V., Polyakov D.N., Vasilyak L.M. // Journal of Physics: Conference Series. 2015. V. 653. P. 012132.
2. Shumova V.V., Polyakov D.N., Vasilyak L.M. // Journal of Physics: Conference Series. 2016. V. 774. P. 012182.
3. Shumova V.V., Polyakov D.N., Vasilyak L.M. // Journal of Physics: Conference Series. 2018. V. 946. P. 012159.
4. Polyakov D., Shumova V., Vasilyak L. // J. Appl. Phys. 2020. V. 128. P. 053301.