SURFACE RESEARCH OF PLASMA CRYSTAL PARTICLES*

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The main purpose of this research work is to analyze the plasma influence on particles surface which constituent plasma crystal applying methods of scanning atomic-force and electronic microscopy.

In this research we used melamine-formaldehyde (MF-R) monodisperse spherical particles with attested sizes (4.86 ± 0.07 mkm). During the experiments particles were in plasma of stationary glow discharge in neon with different exposure time – 10, 20, 40 minutes. The surface profile analysis of the particles before their injection into plasma and after their extraction from plasma was made on scanning electronic microscope and on scanning atomic-force microscope in contact mode.

As a result of research the following distinctions of particles surface have been revealed:

1) When the exposure time in plasma increase, the size of surface microroughnesses increases also, which might be caused by globular structure of microparticle «body».
2) On samples of particles with exposure times 20 and 40 minutes the presence of increasing deepenings (cavities) on a surface, caused by their destruction under action of plasma components, is clearly visible.
3) Found out the peculiarities of microparticle surface structure in the form of equidistance regular stripes, which pass across all particle surface, and which become more noticeable with exposure time increase of a particle in the discharge. Their presence is caused, apparently, by the manufacturing technique of particles.
4) Found out the separate fragments, whose origin is not known yet, which are similar to «globules» from the body of microparticle, and which have stuck to it surface.

All these distinctions show that conditions of exposure time lead to visible modification of microparticles superficial and internal structures in discharge. And they can influence on physical and chemical environment characteristics of the regular plasma-dusty structures and on creating nanosize fragments of microparticle matter. Besides they can influence on process characteristics of charging, adsorption, desorption for immersed in plasma particles of condensed dispersion phase.

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* Work supported by
the Ministry of Education and Science, Russian Federation;
the US Civilian Research and Development Foundation, USA;
the Government of Karelia Republic, Russian Federation.