

Generation of particles from electrodes with a small radius of curvature in a diffuse discharge of atmospheric pressure at the energy input of ≈ 1 mJ

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In air, nitrogen, argon and helium at atmospheric pressure, the radiation of a diffuse discharge plasma formed between two electrodes with a small radius of curvature was studied. With a nanosecond voltage pulse duration and energy input into the gas ≈ 1 mJ, tracks of particles escaping from bright spots on the electrodes, including transverse to their surface, were recorded. It has been established that under these conditions the length of the tracks depends on the polarity of the electrode and that in the air the particle tracks end in a bright glow region. It has been shown that the highest brightness of radiation during discharges in four gases is found in tracks that were formed in air. From this, as well as from the observed glow duration of the tracks of hundreds of microseconds, it follows that their emission is mainly determined by the heating of the electrode material as a result of interaction with oxygen.

Keywords: particle tracks; air; nitrogen; argon; helium; diffuse discharge; inhomogeneous electric field; low energy inputs.

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