On UV, visible and IR spectra emitted from non-thermal plasma jets of DC and barrier discharges at atmospheric pressure

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The report contains the experimental results on a spatial distribution of UV, visible and IR spectra along non-thermal plasma jets generated by steady-state DC glow discharge and dielectric barrier discharge at atmospheric pressure. Plasma forming gases are N2, Ar, He and their mixtures with O2. Plasma jets enter the ambient air at atmospheric pressure. Variable parameter is a gas flow velocity at the outlet of plasma source. The results obtained allow to determine the distribution along plasma jet of both the gas temperature and the composition of reactive species produced by non-thermal plasma. This information is of great interest for the development of mechanism of plasma species generation and for practical applications (surface modification, biomedicine, etc) based on the usage of non-thermal plasma jets at atmospheric pressure.

  

 a) b) c)

Fig. 1. Plasma jet photos (side-on view) for dielectric barrier discharge jet (a), waveforms of current and voltage of DBD (b), emission spectrum of the plasma generated in argon at the outlet of the discharge zone (c).

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 a) b) c)

Fig. 2. Plasma jet photos (side-on view) for glow DC discharge jet (a), emission spectrum of the plasma generated in nitrogen (b) and air (c) at the outlet of the discharge zone.