MICROWAVE TORCH PHYSICS AND PLASMACHEMICAL APPLICATIONS

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Coaxial microwave plasma source – "microwave torch" – has been investigated as a means for effective plasma production in a gas stream with atmospheric pressure and rate of flow as high as 25-50 l/min. Magnetron widely used in a domestic techniques has been applied as a microwave generator (power $P \leq 1$ kW, wavelength $\lambda \cong 12$ cm).

Results of gas temperature (T_g) measurements are presented. For T_g determination set of diagnostics has been applied:

- holographic interferometry;
- measurements of a continuous part of a radiation spectrum;
- measurements of a temperature of microparticles introduced into torch volume.

According to the performed measurements temperature of a gas in an argon torch volume is as high as $T_g \cong 4000 – 5000$ K.

Results of microwave torch dynamics investigation are presented as a result of electron concentration (n_e) measurements with help of microwave and CHN laser interferometers application.

Mechanisms of microwave energy absorption by plasma and this energy transport into gas medium are discussed as well as plasma chemical applications of microwave torch (nitrogen oxides production, natural gases utilization, CFCs and poison gases decomposition, etc.).