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Data Processing from Micro-Plasma Gas Analytical Sensor¹ ALEXANDER MUSTAFAEV, ALEXANDER TSYGANOV, Department of General and Technical Physics, St.-Petersburg State Mining University, 199106, St.-Petersburg, Russian Federation — Theoretical consideration of signal formation at micro-plasma gas analyzer based on Collisional Electron Spectroscopy (CES) and experimental results on CES sensor are presented. It is demonstrated that a diffusion path confinement for characteristic electrons provides a possibility to measure electrons energy distribution function (EEDF) and to find characteristic spectra of species at high (up to atmospheric) gas pressure. Simple micro-plasma CES sensor of two plane parallel electrode configuration with current-voltage measurement in afterglow discharge may be operated in two possible modes. The first mode presumes application of classic 2-nd derivative of current-voltage curve to select characteristic peaks in electron energy spectra of the species to be detected. In the case of a deeper collisional dissipation of characteristic peaks, a 3-rd derivative may be used. Said derivatives were obtained by differentiating of a spline providing least-squares approximation of current-voltage curve. Model and experimental electron energy spectra of pair He metastables collisions in dependence of inter-electrode gap are discussed.

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