

Abstract Submitted
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Xenon Additives Detection in Helium Micro-Plasma Gas Analytical Sensor ALEXANDER TSYGANOV, St.-Petersburg State Mining University, Russia, ANATOLIY KUDRYAVTSEV, St.-Petersburg State University, Russia, ALEXANDER MUSTAFAEV, St.-Petersburg State Mining University, Russia — Electron energy spectra of Xe atoms at He filled micro-plasma afterglow gas analyzer were observed using Collisional Electron Spectroscopy (CES) method [1]. According to CES, diffusion path confinement for characteristic electrons makes it possible to measure electrons energy distribution function (EEDF) at a high (up to atmospheric) gas pressure. Simple geometry micro-plasma CES sensor consists of two plane parallel electrodes detector and microprocessor-based acquisition system providing current-voltage curve measurement in the afterglow of the plasma discharge. Electron energy spectra are deduced as 2-nd derivative of the measured current-voltage curve to select characteristic peaks of the species to be detected. Said derivatives were obtained by the smoothing-differentiating procedure using spline least-squares approximation of a current-voltage curve. Experimental results on CES electron energy spectra at 10-40 Torr in pure He and in admixture with 0.3% Xe are discussed. It demonstrates a prototype of the new miniature micro-plasma sensors for industry, safety and healthcare applications. [1]. A.A.Kudryavtsev, A.B.Tsyganov. US Patent 7,309,992. Gas analysis method and ionization detector for carrying out said method, issued December 18, 2007.

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