Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Ultra-compact photoionization analyzers. Ecological monitoring application at hazardous production facilities. ALEXANDER MUSTAFAEV[1], IULIIA RASTVOROVA, FATIMA ARSLANOVA, Saint-Petersburg Mining University — It is generally recognized that careful implementation of ecological monitoring should be provided at hazardous production facilities continuously to protect the surrounding environment as well as health and safety of employees. However, the existing devices may not be able to control the environmental situation uninterruptedly due to their technical characteristics or measurement methods. Developed by The Mining University Plasma Research Group ultra-compact photoionization analyzer is proposed as innovative equipment which creates the basis for a new measuring approach. The general operating principle is based on the patented method of stabilization of electric parameters – CES (Collisional Electron Spectroscopy). During the operation at the atmospheric pressure, the vacuum ultraviolet (VUV) photoionization sensor measures the energy of electrons produced by means of ionization with the resonance photons whose wavelength is situated in the VUV. A special software tool was developed to obtain the second-order derivative of the I–U characteristics, taken by the VUV sensor, to construct the characteristic electrons energy spectra. The portable analyzer with a unique set of parameters such as small size (10*10*1 mm), low cost, a wide range of recognizable molecules, great measurement accuracy at the atmospheric pressure can be effectively used both for rapid testing of air pollution load and the study of noxious factors that influence oil and gas industry employees.

[1]Dr. Sci., Ph.D, Principal Scientist, Professor

Alexander Mustafaev
Dr. Sci., Ph.D, Principal Scientist, Prof.

Date submitted: 14 Sep 2017 Electronic form version 1.4