

Technology Offer

Analytical system for atomic fluorescence with atomization cell in the capacitive coupled plasma atomization

Summary

A Romanian research institute has developed a system that integrates for the first time capacitive coupled plasma (CCP) cells as an atomization cell in a modular optical system with atomic fluorescence detection. The Romanian research institute is looking for an industrial partner for licensing, manufacturing or commercial agreements with technical assistance, that can take the system and develop it into a commercial product.

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Details

Description

A Romanian research institute has developed an analytical system for atomic fluorescence with atomization cell in the capacitive coupled plasma atomization that allows elementary analysis through optical spectrometry using a capacitive coupled plasma torch of average power for sample atomization.

The sample is introduced into the plasma as an aerosol obtained through spraying (pneumatic or ultrasonic) or hydride generation system. The sample sprayed in the plasma goes through a process of drying and atomization.

Obtained atoms are optically excited are produced by a primary source of radiation emitted by a discharge lamp without electrodes (DLE) and focused by an optical system on the plasma.

Following excitation, the atoms emit characteristic fluorescence radiation and return to the ground state. Emitted fluorescence spectrum consists of spectral lines whose intensity is proportional to the concentration of the element in the sample.

Optical signal detection is performed with a microspectrometer with concave diffraction grating and charge coupled detector (CCD). Optical radiation is collected by a system of collimator and optical fiber. The role of the spectrometer is to select the atomic fluorescence spectral line and to measure the intensity of the line reported to the background signal of the plasma.

Quantitative analysis is realized based on a calibration with solutions of known concentration, according to instrumental analysis methods.

The Romanian institute is seeking a chemical/environmental protection company for licensing, manufacturing or commercial agreements with technical assistance to develop it into a commercial product.

Advantages and Innovations

Novelty of the analytical system using a capacitive coupled plasma (CCP) is using average power as atomization cell in atomic fluorescence measurement.

Capacitively coupled plasma is characterized by a relatively hot environment, which provides a good conversion of the sample in free atoms.

The CCP operated at a lower power has a lower continuous background emission in the UV and provides good atomization of the sample.

The CCP develops into a quartz tube, eliminating air diffusion in the plasma and thus it is expected that noise due to scattering of the excitation radiation by any solid particles is smaller.

The CCP provides good sensitivity analysis by AFS and actually being an optimal atomization cell for atomic fluorescence with applicability to elementary analysis in a complex matrix.

By applying the analytical system, the following advantages will result:

- improving the detection limits for elementary analysis by an order of magnitude for medium power plasma compared to the atomic emission spectrometry;
- reducing the argon consumption on generating plasma under 1 l min⁻¹, as compared to 10 -20 l min⁻¹ for inductively coupled plasma;
- the lack of non-spectral effects and reducing pre- filter and post-filter fluorescence phenomena;
- reducing the cost price of analytical instrumentation for its execution and during its use;
- the long form of the plasma provides a good atomization of the required sample for the measurements through atomic fluorescence.

Stage of Development

Under development/lab tested

IPR Status

Patent(s) applied for but not yet granted

Comment Regarding IPR status

Patent applied for at the State Office for Inventions and Trademarks. IP rights for Romania.

Keywords

Technology

03004004	Electrical Engineering/ Electrical Equipment
08002001	Detection and Analysis methods
09001002	Analyses / Test Facilities and Methods
09001007	Optical Technology related to measurements
10002008	Measurement and Detection of Pollution

Market

08002002	Industrial measurement and sensing equipment
08002003	Process control equipment and systems
08004001	Air filters and air purification and monitoring equipment
08004002	Chemical and solid material recycling
08004003	Water treatment equipment and waste disposal systems

NACE

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Other professional, scientific and technical activities n.e.c.

Network Contact

Issuing Partner

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Open for EOI : **Yes**

Client

Type and Size of Organisation Behind the Profile

R&D Institution

Year Established

0

Already Engaged in Trans-National Cooperation

No.

Languages Spoken

English

Client Country

Romania

Partner Sought

Type and Role of Partner Sought

- Type of partner sought: SME
- Specific area of activity of the partner: chemistry, environmental protection
- Task to be performed by the partner sought:
- the licensee will manufacture (assembly & engineering) the system, with technical consultancy offered by the Romanian company.

Type and Size of Partner Sought

SME 11-50, SME <10, SME 51-250

Type of Partnership Considered

License agreement
Manufacturing agreement
Commercial agreement with technical assistance