THE DETERMINATION OF THE CONTENT OF METAL IONS IN WATER SOLUTIONS BY USE OF A DC-CURRENT DISCHARGE WITH A LIQUID CATHODE

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The emission-spectral analysis of water and aqueous solutions on the content of metal ions is one of the promising applications of plasma-solution systems. High sensitivity (up to 10^{-9} gl^{-1}), low power consumption, no need for expensive equipment are the advantages of this method. However, it is established that the composition of the electrolyte-cathode affects the emission intensities of the lines of metal atoms. A possible solution to this problem is presented in this study. We suggest adding an aliquot of a solution of a metal salt with a known concentration to the analyzed solution and further determining the number of atoms of the analyzed metal in the plasma by the actinometry method. In this case, the metal atoms, whose cation concentration in the solution is known, is an actinometer. The concentrations of the corresponding cations in the solution are determined from the known number of atoms of the analyzed metal in the plasma, using the transfer coefficients.

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SPATIAL DISTRIBUTION OF A NON-EQUILIBRIUM LOW TEMPERATURE PLASMA GENERATED BY AN ECR PLASMA SOURCE

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Non-thermal plasmas have shown relevant results in agriculture thanks to its low temperature, the relatively important reactive species and biocidal agents. In this study, the spatial distribution of a coaxial microwave plasma source in a 90 litres vacuum chamber was assessed in order to provide a homogeneous treatment on seeds in future work. The plasma source (SAIREM SAS) conception was based on Electronic Cyclotron Resonance (ECR) to sustain the plasma in the low-pressure range (air, $10^{-4} - 10^{-1}$ mbar). A 2.45 GHz solid-state generator (SAIREM SAS) was used as power feeding for the source while ensuring minimal power-losses and perfectly matched impedance. The parameters of the discharge were measured by a Langmuir probe (Impedans) at various positions in the vacuum chamber. In parallel, optical emission spectroscopy measurements have been performed at various positions with a Horiba Jobin Yvon iHR320 spectrometer in order to identify the plasma species' spatial distribution.

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INVESTIGATION OF PECULIARITIES OF THE DISCHARGE EXCITATION WITH HOLLOW CATHODE EFFECT IN N_2 IN A TUBE ELECTRODE

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The influence of some constructive discharge system elements on the electric excitation modes and stable maintaining of pulse glow discharge plasma in N_2 in a hollow tube cathode has been investigated. The following discharge system changes have been performed: the position of a hollow electrode-cathode in the dielectric tube-holder; the method of plasma forming gas feeding to the discharge area; the distance between the electrode-cathode and counter-electrode (grounded anode). The investigation has been carried out within 50 - 700 Pa N_2 pressure range. The obtained results may be used in the design of gas discharge systems with hollow cathode effect.