MULTIELEMENT LIGHT SOURCES FOR ATOMIC ABSORPTION ANALYSIS

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Introduction: Optimization of design parameters of spectral light sources allows to extend the use of the spectral analysis, and in particular in the multi-channel devices atomic absorption analysis.

Objective: The actual problem of atomic absorption analysis in medicine and pharmacy is the creation of multi-spectral light sources. The use of multi-element lamps eliminate the need for a change of light sources in the restructuring of the analyzer on the various elements thereby reducing the analysis time.

Materials and Methods: Use as a spectral light sources, hollow cathode lamps due to the advantages of this form of discharge as the almost complete absence of the field and the low temperature of the gas in the negative glow.

The discharge of the hollow cathode allows to initiate intensive and at the same time sufficiently complete spectra of neutral atoms and ions with narrow lines is almost completely free of the broadening due to the Stark and Doppler effects. Due to the peculiarities of the discharge mechanism of the hollow cathode discharge are present in the spectrum of the arc and spark lines as the main gas and cathode material.

Results and discussion: Usually atomic absorption spectrometer contains multiple light sources, selectable using a stepper motor. This causes an additional error source when changing. There are multi-element design of lamps with multiple cathodes within one tube. The disadvantage of such structures is a significant increase in lamp size and partial diaframirovannie emission cathodes distant.

Additionally, you must rebuild the optical system control device for the removal of various cathodes. It is proposed to use a coaxial cylindrical hollow cathode instead of the cathode for the creation of a multi-element light source for spectral analysis. Along the axis of the cathode cavity accommodate 5-6 bars of equal length cathodes made of different materials. The diameter of the rods must be minimal, but to a certain size so that it does not lead to the heating

and deformation of the rods. The radius of the circle on which the rods must be located advisable to take equal to half the radius of the cathode polosti. Eto due to the fact that the bars do not extend beyond the region of negative glow that can reduce the radiation intensity. Accommodation close to the axis of the rods leads to mutual screening rods from the ions coming from the negative glow, which can also reduce the intensity of the radiation.

The current density of the rod of the cylinder can exceed the current density of the order. Therefore rod sprayed more intensively than the cylinder, hence at small discharge currents will occur in the spectrum lines of the material web and the cylinder are fixed line material.

Thus, a compound of one of the cylinder rods to the cathode leads to a source line in the spectrum of radiation material rod. To change the form of the spectrum is only necessary to connect to the cathode corresponding rod

Conclusions: The proposed design of the light source it is possible to control the intensity of the emission spectra of different elements at a constant discharge current by applying the rod of a building. The proposed multi-element light source can be used in devices for multi-atomic absorption analysis.