

Three-dimensional structure of the radiation beam in atomic absorption spectrometry

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Abstract

The results of an investigation of the three-dimensional distribution of radiant intensity in the probing radiation beam produced in a conventional atomic absorption spectrometer by hollow cathode lamps and electrodeless discharge lamps are presented. The investigation is based on the use of a photodiode array-based digital imaging system. The results obtained revealed that the probing radiation beam is highly non-uniform, both longitudinally and radially. The character of the non-uniformities is greatly dependent on the type of the primary source. An interpretation of the results is given and the possible consequences of the radiation beam non-uniformities for the application of Beer-Lambert's law are discussed.

Keywords

Atomic absorption spectrometry, Beer-Lambert's law, Radiation beam structure