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A TWO-JET PLASMA AS A PROMISING EXCITATION SOURCE FOR AES ANALYSIS OF POWDERED SAMPLES

Natalia P Zaksas

Nikolaev Institute of Inorganic Chemistry-RAS, Russia

The possibility of two-jet plasma atomic emission spectrometry for analysis of different powdered samples is considered. A two-jet plasma (TJP) was developed in the USSR approximately at the same time as ICP, but it was not generally recognized as ICP due to the plasmatron was produced in single copies and was not being modernized for decades. Nowadays the TJP has been designed at "VMK-Optoelektronika" (Russia) and a modern plasmatron is used at several research institutes although the plasma burners are still being improved. The main advantage of the TJP over ICP is high power (up to 12 kW), which allows direct analysis of powdered samples without sample digestion. In addition, the consumption of working argon is several times lower than in ICP and does not exceed 5 L/min. It is well known that calibration is still a challenging task when dealing with the direct analysis of solids due to the lack of certified reference

materials of different nature. This problem is not so critical for the TJP-AES because of comparatively weak matrix effects. The TJP-AES techniques developed for analysis of high purity substances, geological and biological samples allow using simple sample preparation and unified calibration samples based on graphite powder although some limitations and peculiarities occur. The samples from several mg up to 0.5 g can be introduced into the plasma. Advantages and limitations of the method are discussed in terms of matrix effects, element species, and excitation mechanisms in the plasma. In spite of some difficulties, the TJP-AES allows fast estimating the content of a wide range of elements in different solid samples and solving some analytical problems difficult to solve by other methods.

zak@niic.nsc.ru