ATOMIZATION OF SYNTHETIC AND REAL SAMPLES USING HEATED GRAPHITE ATOMIZERS FOR ATOMIC ABSORPTION SPECTROSCOPY.

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A C K N O W L E D G E M E N T S

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"But, my son, be warned: there is no end of opinions ready to be expressed. Studying them can go on forever, and become very exhausting. Here is my final conclusion: fear God and obey His commandments, for this is the entire duty of man." (King Solomon 977 B.C.)

ABSTRACT.

The interference effects caused by a number of matrices including compounds such as NaCl, HCl, KBr, HNO_3, H_3PO_4, H_2SO_4 on Cu, Pb, Cd and Al atomic absorption signals when the elements are atomized from three non-flame graphite atomizers (furnace, cup and rod) are studied over several concentration ranges. Investigations show that most of the interferences found occur in the vapour phase. A comprehensive literature survey has been done and from this survey and the experimental work carried out, discussions are presented on the postulated mechanisms of interference. Two main theories are given for the vapour phase interference,

i) entrapment of the atom in the matrix particle forming in the vapour,

ii) rapid molecular condensation in the vapour phase.

Several degrees of interference (both enhancement and depression) were obtained for the different chemical and atomization systems used. Attempts were made at rationalizing the degree and type of interference in terms of the postulated models. Supporting evidence for the atom entrapment theory was gained from an investigation of the nature of the non-atomic absorption peak obtained mainly when alkali halides are present in the sample. Evidence is produced showing that the absorption spectra obtained from alkali halides here and by other workers are charge-transfer spectra.

An investigation into the use of a graphite atomizer for zinc analysis in bovine serum is presented and compared to determinations using flame atomic absorption on the same samples.

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