The instrumentation used consists of the ICP - AES polychromator Jarrell Ash ICAP 9000, installed on-line device for flow injection sorption preconcentration BPI - 01 (Cortec, Russia), micro column packed with DETATA sorbent (aminocarboxylic) and Chelex-100 sorbent. Off-line sorption experiments were realized with multi channel flow device BPI (Acvita Co., Russia).

There are many factors that influence effective FI preconcentration: content of salts, sorption and desorption flow rates, sorption and desorption times (ore volumes of the sample and eluent), pH, acid concentration in eluent, kind of eluent, etc. Therefore, fractionary factorial design was used to obtain an adequate sensitivity and also to optimize the emission signal of ICP. The orthogonal designs have been used, recovery, equivalent volume, emission signal, enhancement factor has been chosen as dependent variable. The investigation of recovery was carried out in off-line mode. The second order design for two independent variables has been realized. The regression functions describing the investigated systems have been calculated, and visual graphical interpretations of these dependencies were developed as well. The model enables to calculate a value of the sorption degree for any salt concentration and pumping rate inside the ranges investigated. It is shown that in dynamic sorption DETATA is more effective compared to Chelex-100. The optimum conditions differ for each of the analytes studied. Therefore, the optimization of a group sorption for 10 analytes studied is the conciliatory solution of the mathematical models for the whole group of analytes. For correcting the sorption incompleteness in compromised conditions, a correction factor for each analyte, calculated from the obtained models, was entered into the determination program. The proposed method is the fast and effective tool for the investigation of sorbents and developments of the analytical procedures.

The ICP-AES methods of the determination of Al, Co, Cu, Ni, Mn, V, Pb, Zn, Ti in potassium chloride solution with their on-line and off-line pre-concentration were developed. Variations of the sorption degree when the matrix concentration in solutions changes are corrected with the help of the factors calculated from the developed models. The determination range is 0.001- 0.5 mg l-1 and the relative standard deviation is 0.08-0.30, depending on the analyte and its concentration.
~200g/l) that results in high unselective absorption in ETAAS and high background emission in ICP-AES. Multielement preconcentration with separation of matrix is an effective solution of this problem.

Electrothermal atomic absorption (ETAAS), inductively coupled plasma atomic emission spectrometry (ICP-AES) and off-line sorption preconcentration have been used for the development of new sensitive and selective methods of heavy metals determination in the salts and waste brines. Measurements were carried out using atomic absorption spectrophotometer Perkin-Elmer Zeeman/3030 Model with HGA-600 electrothermal atomization system, for multielement measurements the ICP-AES polychromator Jarrell Ash ICAP 9000 was used. Device for flow injection sorption preconcentration BPI (Aquita, Russia) with 4 micro columns packed with DETATA sorbent (aminocarboxylic on polysterene base) was used for separation and preconcentration of heavy metals.

There are many factors that influence effective FI preconcentration: content of salts, sorption and desorption flow rates, sorption and desorption times (ore volumes of the sample and eluent), pH, acid concentration in eluent, kind of eluent, etc. The parameters of simultaneous multi-element sorption, elution, and signal registration have been optimized. The parameters of flow sorption ICP - AES analysis of the samples with complex matrices were investigated and the analytical procedure for simultaneous determination of Cd, Zn, Pb, Cu, Ni, Mn, V, Ti, Al by ICP-AES in industrial brines and salts was developed.

For routine laboratories methods of ETAAS determination of elements in concentrate solutions are developed and proposed for validation as standard methods. Using reference brines the bias, precision and accuracy of methods were determined according to Standard Procedure for Certification of Measurement Methods. Sensitivity of proposed methods is better for the factor of 10 - 100 than that for the certified methods used in salt industry now.

FRACTIONATION OF WATER SOLUBLE FORMS OF HEAVY METALS IN SLUDGE BY FLOW INJECTION SORPTION - ICP-AES

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The content of water - soluble and mobile species of heavy metals in wastewater and potable water sediments is the major criterion for its subsequent utilization. Determination of the species content is generally conducted by the techniques, which are similar to those applied to soils. It is well known that humulinic acids fix trace elements in soil extracts. Wastewater sediments significantly differ by chemical composition (especially by nature of organic matter) from soil ones. The purpose of long-term treatment of these residues is a transformation of organic substances to humus. Dynamics of alternation of the organic to inorganic species ratio can be chosen as an indicator of the treatment process.

A technique for the determination of organic and inorganic species of heavy metals in aqueous extracts of wastewater and potable water sediments has been developed for the monitoring. Aqueous extracts were prepared according to standard method. In order to separate the species a technique of flow sorption preconcentration and separation (dynamic sorption) was