from the environment. The relationship between structure and degradability of oil components has wide significance. Many oil components are known to undergo biodegradation but the rates and extent of degradation differ.

In general microbial attack on petroleum has been shown to occur toward or \( n \)- and branched alkanes or light aromatic compounds. High molecular aromatics, resins and asphaltenes exhibiting very low rates of biodegradation.

In the present work, the qualitative and quantitative changes of oil composition were investigated and compared during laboratory biodegradation experiment and in field oil spills under natural factors.

In model experiments the compounds, considered relatively recalcitrant to the effect of microorganisms, were found as the most degradable (resins and asphaltenes). Moreover, in some experiments we observed no detectable changes in \( n \)-alkane profile, while losses of total mass of crude oil sample was reached about 60%.

We have studied the distribution and spreading as well dissipation processes of oil and other organic pollutants (the change of concentration and molecular weight distribution (MWD) of paraffins, alkylbenzenes, polycyclic aromatic hydrocarbons and oxidized compounds) in natural waters, soils and other environmental constituents in oil- and gas producing West Siberia regions.

It was shown that self-rehabilitation period of the West Siberia environment exceeds 20 years even after a single oil spill. The presence of light paraffins \( C_{14}-C_{20} \) observed in MWD of paraffins was noticed both for model biodegradation and oil spill of 20 years' remoteness. Thus, natural processes such as evaporation, oxidation, and biodegradation can start the cleanup process, but are generally too slow to provide adequate environmental recovery.

The obtained data indicate that oil is subjected to biodegradation as a whole system both in environment and in model laboratory experiments, with "more resistant" compound classes can be attacked prior to complete destruction of a "less resistant" class (\( n \)-alkanes).

The analyses of organic pollutant compositions in natural water, sediment, soils and petroleum components in model biodegradation culture fluids have been carried out by gravimetry, column chromatography and GC/MS techniques and by US EPA 625 and 8270C Methods. Acenaphthene-\( d_{10} \) and perylene-\( d_{12} \) were used as internal standards.

**PRECONCENTRATION OF SELENIUM BEFORE ITS X-RAY FLUORESCENCE DETERMINATION IN A NATURAL WATER**

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Key words: selenium, natural water, preconcentration, extraction, humates, ultrasonic, directed crystallization, X-ray fluorescence analysis, specimen

Selenium in natural water is most commonly determined by means of low-selective photometric method. The method of X-ray fluorescence (XRF) analysis is distinguished by selectivity, universality and accuracy. But this method has insufficient sensitivity in the case of selenium determination on a maximum permissible limit level. However it may be combined with group preconcentration of impurities.

For direct XRF analysis of water containing 1-5 mg/l of selenium, we have proposed addition of dry gelatine to small volume of water sample to be analyzed followed by moulding an elastic specimen of given size and shape after weak thermal treatment of this mixture.
For XRF determination of small quantities of selenium (0.005 mg/l) in water we have proposed preliminary extraction of selenium in form of diethyldithiocarbaminate complex from strongly acid medium. In these conditions zinc and iron, which affect the XRF analysis results, are not extracted, and copper may be separated by its preliminary extraction from weak alkaline medium. The completeness of the selenium extraction depends on the contents of humate complexes, which are always present in natural water. To eliminate the interfering humate action, we have proposed preliminary ultrasonic treatment of samples to be determined. After extractional concentration, the sample weight of dry polymer Carbosil-70 was dissolved in the obtained chloroform extract, then the chloroform from this solution was evaporated and a fine-film specimen was produced.

A XRF method has been developed for determination till 0.005 mg/l of selenium in water after preconcentration of impurities by means of low-temperature directed crystallization. The saccharose weight was added directly to the obtained liquid concentrate (volume 1-2 ml), the mixture was slightly to the caramel formation, and shaping of the glassy specimen was carried out.

Specimens that have been proposed by us for analysis of concentrates are easy to make, they have high quality of working surface, meet the criteria of thin or unsaturated layer; they do not contribute significantly the total error of XRF analysis (S_r=0.06-0.10).

DETERMINATION TRACE ELEMENTS OF GYPSUM BY FLAME ATOMIC ABSORPTION SPECTROMETRY AFTER ENRICHMENT TECHNIQUES

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Gypsum is a mineral that is used in different industries and especially for architectural material for buildings. The chemical and physical properties of gypsum might be change depending on its trace constituents. Therefore, it is important to determine the content of trace elements of gypsum samples.

In this study, we were going to developed analytical scheme that are using enrichment methods such as an extraction procedure with APDC complexing into MIBK or colloid flotation for determination of Zn, Cd, Co, Ni, Pb, Ag, Mn and Cu in gypsum by FAAS. Flotation is a well-known technique for a selective separation of desired substances from minerals (1,2). The calcium content of samples has shown severe interference for the determination of trace elements by flame AAS. During flotation hexamethylenedithio-carbamate anion (HMDTC) was used for the separation of trace elements from calcium sulphate matrices. Chemometric optimisation studies are performed for the require preconcentration and separation using flotation technique. Three parameters such as mass of iron, amount of hexamethylenedithiocarbamate anion (HMDTC) and pH were optimised for preconcentration of Zn, Cd, Co, Ni, Pb, Ag, Mn and Cu.

References