

Testing of monolithic chromato-desorption systems with organic solvents under extreme conditions

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At the present stage of development of analytical chemistry several important tasks are being solved, one of which is the improvement of existing methods and means of preparation of gas and liquid mixtures of known composition, as well as the creation of fundamentally new methods of obtaining standard samples.

Today, one of the understudied dynamic methods of production of the mixtures is the creation of a flow of organic solvents with a certain content of the target component released from the monolithic polymer matrix.

The purpose of this work is to study the possibility of obtaining constant concentrations of organically-soluble analytes in organic media during the operation of monolithic chromato-desorption systems (MHDS) under extreme conditions.

Monolithic chromato-desorption systems were manufactured using a modified two-component epoxy resin as a matrix material. *N*-octane was used as a solvent. As analytes, several saturated fatty acids – tetradecanoic acid, pentadecanoic acid, hexadecanoic acid, and octadecanoic acid – were chosen. The analytes under study have high solubility in nonpolar organic solvents.

The manufactured experimental samples were studied in dynamic mode of extraction using a specially designed extraction system at temperatures of 50, 80 and 120°C and an eluent flow rate of 3 cm³/min, using *n*-octane as the eluent.

According to the results of chromatographic analysis of octane solutions of organically-soluble analytes, it can be concluded that to obtain quasi-stationary concentrations in the dynamic extraction mode it is necessary to ensure the passage of 500-600 cm³ of extractant through the samples under study at a flow rate of 3 cm³/min. The error of maintaining constant concentrations does not exceed 10%.

A comparative evaluation of the degree of extraction of organically-soluble analytes from MHDS at different temperatures in the dynamic mode of extraction was carried out. It was found that the increase in extraction temperature leads to an increase in the content of the studied organically-soluble analytes in *n*-octane.

As a result of the experiment, it was concluded that the use of fabricated MHDS allows to obtain solutions of *n*-octane with known analyte content in dynamic extraction mode at 50, 80 and 120°C.

The results obtained can be used to create solutions with known content of organically-soluble analyte by dynamic method.