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The Use of Microemulsions for the Extraction and Simultaneous Pre-Concentration of Perspective Chemical Markers for Identification of Hydrocarbon Fields

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Today the development of new techniques in the elicitation and identification of hydrocarbon chemical markers is of current interest. The key point of this study is to find out new analytical approaches of more selective (or group quantitative) extraction of trace amounts of chemical markers from oil.

The elicitation of chemical markers is the priority goal for the identification of hydrocarbon deposits and the assessment of their catagenetic maturity. But in most cases, it was only possible to state about group analysis without description of specific chemical structures. Moreover, signals from mixture of various compounds, which belong to different classes, were considered as individual compounds. It may distort and depreciate the interpretation of the results of chemical analysis. In addition, it means that numerous markers remain unexplored and those compounds or derived indices, which were considered as markers, may actually be false.

The main point of this work is the application of liquid nanostructured systems - "microemulsions" - as new extractants in the analysis of oil chemical markers. They possess unique properties in comparison with micellar media: ultralow interfacial tension, large interfacial area, thermodynamic stability and the ability to solubilize otherwise immiscible liquids due to their combination of hydrophilic and hydrophobic phases.

Thus, described above characteristics of microemulsions can be used in the analysis of complex mixture of substances such as petroleum. They provide an opportunity of more selective or sometimes group quantitative extraction of chemical markers from the objects. Moreover, the following decomposition of microemulsions before the injection to the chromatograph or other analytical devices lead to the significant concentration (approximately 1-2 orders of magnitude) of the target substances. It may increase the sensitivity of determination of new and existing chemical markers.

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