



Composition research of n-alkanes in hydrothermal systems of Mid-Atlantic Ridge by method gas chromatography/ mass spectrometry

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The composition of n-alkanes in hydrothermal formations was studied in hydrothermal fields of several zones of Mid-Atlantic Ridge. The samples for investigation were collected on cruise 50 of R/V Akademik Mstislav Keldysh by Mir-1 and Mir-2 manned submersibles (Shirshov Institute of Oceanology, RAS).

Molecular and group compositions of n-alkanes were analyzed in sulfide and carbonate deposits of hydrothermal fields in Mid-Atlantic Ridge (Rainbow, Lost City, Broken Spur) related with ultrabasic rocks in oceanic core and basalt volcanism.

As a result of experiments it was devised procedures of detected and research n-alkanes in hydrothermal deposits using gas chromatography-mass spectrometry (GC/MS) method. Detection limit of n-alkanes by using this procedure formed 3×10^{-9} – 10^{-8} % depending on the component. It was shown a presence of n-alkanes C15-C32 in most explored samples of hydrothermal deposits.

Total n-alkanes concentrations in the samples from Mid-Atlantic Ridge are low and vary widely from 0,02 to 0,038 $\mu\text{g/g}$ of dry weight of ore deposits. These differences can be explained by different conditions of ore deposit formation (pressure, temperature), different mineralogical composition of ore deposits, and possibly by some others.

Analysis of sulfide samples from the Broken Spur showed presence of n-alkanes biogenic and abiogenic-thermocatalytic nature in equal amount.

It was concluded that the composition of n-alkanes in hydrothermal deposits from the Lost City hydrothermal field is influenced by two prevailing processes of organic matter transformation – microbial and thermocatalytic transformation.

In hydrothermal deposits from the Rainbow field it was revealed abiogenic-thermocatalytic nature of n-alkanes predominantly.