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THE REVIEW OF SOME NOVEL BIOMARKERS IN SEDIMENTARY ORGANIC MATTER

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A series of novel C₃₃-C₃₅ hexacyclic benzohopanes have been identified in coals and crude oils of different ages from all over the world [1]. They differ from regular benzohopanes by the presence of methyl group in position C-31. These compounds are more abundant in coals and terrestrial oils. The investigation also showed that mature samples have distributions of benzohopanes distinct from immature ones, which are characterised by a greater number of benzohopane isomers. Although exact structures of the additional isomers were not determined, it seems they were formed by an isomerisation of alkyl groups attached to the aromatic ring.

Two novel monoaromatic hydrocarbons (MW = 270; basic fragment ions *m/z* 255 and 146) were identified in coals, mudstones and crude oils. Their structures were determined as *cis*- and *trans*-icetexa-8,11,13-trienes (or dehydroicetexanes) using NMR spectroscopy. Dehydroicetexanes are potential biomarkers of *Cupressaceae* (cypress conifers).

Benzo[b]naphtho[d]furans (BNFs) have been identified in oils, condensates, source-rocks, coals and coaly shales, being more abundant in the latter. We detected BNFs (*m/z* 218) in relatively high amounts in the aromatic fractions of pyrolysates of brown coals which attained the maturity corresponding to vitrinite reflectance of 1.80 %Rr [2]. This result suggests that BNFs can be attractive for investigations of mature fluids that originate from gas/condensate prone sources, rich in type III kerogen, which are usually depleted in biomarkers. Recently, it was observed that [2,1]/[1,2]BNF ratio can be used to describe lithofacies [3]. This ratio is much lower in sediments from fluvial-deltaic systems than in clay-depleted sediments from marine environments.

1-Chloro-*n*-alkanes (*m/z* 91) have been identified in saltmarsh vegetation, recent sediments from estuarine setting and freshwater lake sediments [4]. Despite their absence in the investigated crude oils, we identified a series of 1-chloro-*n*-alkanes in pyrolysates of the corresponding asphaltene, obtained at 250 °C. This result indicates very good preservation of biomarkers occluded inside asphaltene and announces a possible application of 1-chloro-*n*-alkanes in correlation studies.

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