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Potential of Quinoline Compounds for the Secondary Oil Migration Indicator

Quinoline compounds were investigated as a biomarker for petroleum migration distance. New laboratory experiment was conducted to evaluate adsorptive ability of each quinoline compounds such as benzoquinolines (Ac : acridine, Ph : phenanthridine, B[f]Q : benzo[f]quinoline and B[h]Q : benzo[h]quinoline) to montmorillonite. The results indicated that Ac was adsorbed most, and the order of three other compounds was Ph B[f]Q B[h]Q. Therefore, we thought that some ratios of these benzoquinolines would be useful indices for petroleum migration distance.

We also analysed actual crude oils from the Sarukawa oil field (Northwest Japan) and the Northern North Sea and quantified benzoquinoline compounds in these crude oils. The results also revealed that Ph/B[f]Q ratio and Ph/B[h]Q ratio decreased with the increase of migration distance in the both oil fields, which was consistent with the results of laboratory experiments.