

THE ENVIRONMENT SIGNIFICANCE OF C₅-C₁₃ LIGHT HYDROCARBON GROUP-TYPE FRACTIONS IN CRUDE OILS

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194 oil samples were collected from 12 oilfields in China and based on the geological background and Gam/C₃₁H(S+R) ratio, the sedimentary environments of source rocks could be classified in terms of salinity into several groups: fresh to brackish lake facies (including limnetic facies), semi-salt to salt lake facies (including marine facies of Tarim Basin) and saline lake facies. By use of Agilent 5975 MSD analysis apparatus equipped with PTV, “back blow”, “microflow controller” and FID, the C₅-C₁₃ group-type fractions in crude oils were separated precisely by GC and about 286 GC peaks were analyzed qualitatively. Thus, the geochemical application of the C₆-C₁₃ group-type fractions and their ratios of each compound were discussed in detail. The results show that the group-type fractions and their ratios of C₆-C₁₃ light fractions in crude oils could be used as a new parameter for oil/oil correlation study.

1. Compared with oils sourced from other environments, the one from fresh water to brackish facies has the highest content of cycloalkane and maximum N/I and N/P ratios. As for the oil from semi-salt to salt facies rocks, the content of C₆-C₁₃ alkanes is the highest. For oil samples from saline lake rocks, I/P and A/P ratios of C₆-C₁₃ fractions are the highest, especially for aromatics (Fig.1).

2. C₇ group-type fractions are characteristic of high percents of C₇ cycloalkane (50% in average), MCC6 (35% in average) and N/I ratio (>2) for the oil from fresh to brackish lake facies; a high C₇ alkane content (60% in average) but low N/I ratio (<2) for the oil sourced from semi-salt to salt lakes facies and marine facies of Tarim Basin; and a high aromatics content (30% in average) but low N/I ratio (<2) for the oil sourced from saline lake sour coaks. For the samples with Gam/C₃₁H(S+R) ratios more than 0.5, their C₇ N/I ratios are less than or equal to 2.

3. The composition of C₆-C₁₃ group-type fractions and their ratios are believed to be affected by maturity of source rocks, however, according to the data obtained from the present study it seems that they are likely controlled by the salinity of source rock sedimentary environments.

P- paraffins; I- isoprenoids; N- naphthenes; A- aromatics

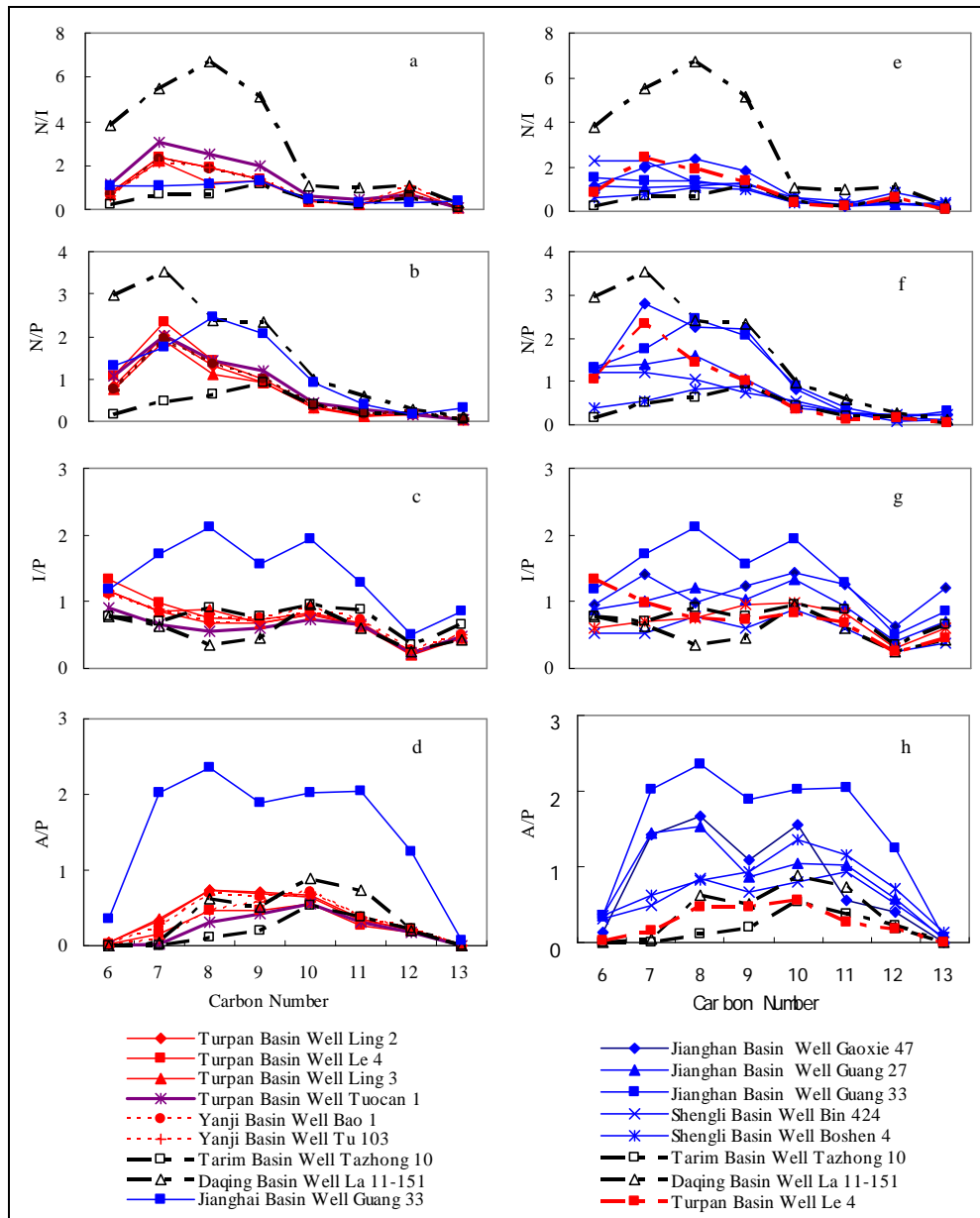


Figure 1. Distributions of C_6 - C_{13} group-type fractions in oils: a, b, c and d for oils from Turpan Basin and Yanji Basin, e, f, g and h for oils from saline lake facies of Jiangnan Oilfield and E_{2s4} of Shengli Oilfield, respectively.

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