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Geological and geochemical characteristics of the Triassic Chang 7 lacustrine source rocks, Ordos Basin, China: Implications for paleoenvironment, organic matter source, petroleum potential and tight oil occurrence

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The Mesozoic petroleum systems are very important petroleum-bearing plays in the Ordos Basin of China. Taking the Triassic Chang 7 lacustrine source rocks in the Ordos Basin as an example, several points having been reached are as follows. (1) The Chang 7 source rocks possess an excellent source rock potential, and the shales hold a better one. (2) The paleoenvironments of the source rocks were sub-reducing to sub-oxidizing conditions and fresh- and brackish-water depositional environments with a maximum water depth of 150m. The organic matter origins are mainly aquatic microorganisms. (3) The beginning time of the oil generation of the source rocks is at 165Ma, and the peak oil generation occurred during 115–95Ma. The cumulative amounts of oil generation are up to 4711×103 t/km2 and the ratios of peak generation amount to cumulative generation amounts are >50%. The beginning timing and peak generation timing of the shales are earlier than those of the mudstones, respectively, and the cumulative oil generation amount of the shales is higher than that of the mudstones. (4) Due to the more remained oil possessed in the shales, the hydrocarbon expulsion threshold of the Chang 7 shales (2560 m) is deeper than that of the Chang 7 mudstones (2080m). (5) The occurrences of the Chang 8-6 tight oils are predominantly controlled by the outer boundary of the Chang 7 source rocks distribution, while the transition areas between thickness, TOC, and RO high-value centers are the accumulation and enrichment zones.

Biography

Luofu Liu is currently a professor at China University of Petroleum, Beijing. He received his PhD from Bristol University in 1992. His main technical interests are organic geochemistry and petroleum geology.

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