

**STUDY ON THE MIGRATION TRACE OF CRUDE OIL IN TAHE OILFIELD FROM
TARIM BASIN, CHINA**

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Take oilfield is the biggest oil and natural gas fields in the strata of Palaeozoic marine carbonate rock in China. Biomarkers in the oils and helium isotope in the associated natural gas have been studied in order to understand the law of oil migration and hydrocarbon reservoir formation. Through the study on the distribution of helium isotope, it is indicated that $^3\text{He}/^4\text{He}$ values ranges from 2.99×10^{-8} to 8.27×10^{-8} , averaging 4.89×10^{-8} and R/Ra values ranges from 0.02 to 0.06, averaging 0.035. This data show the character of crust-derived helium and the formation and migration of oils have nothing to do with the mantle current. There are some law on the regional distribution of Helium isotope in the oil and gas from Take oilfield, which arise from the Helium isotopic fractionation of the diffusion of associated gas and dissolution on the process of oil migration. The double adamantane index can be taken as a good maturity parameter, which shows the early injection at the fourth and sixth district and the later injection at the fourth and ninth district in Take oilfield. According to oils with high maturity and severe biodegradation we selected the parameters not only having good resistance to biodegradation but also being fit for wider maturity ranges in order to research the possible way of oil migration in Take oilfield, for example, the ratios of tricyclic terpane to $17\alpha(\text{H})$ -hopane, rearrangement sterane to regular sterane and $\text{T}_s/(\text{T}_s+\text{T}_m)$. The double adamantane index, Helium isotope distribution and biomarker in the oil and gas revealed that their injection directions and migratory characteristic are the migration from south to north in early stage and migration from east to west in late stage. It is also show the early oil-gas are derived from Manjiaer Sag, while the later oil-gas are derived from Manjiaer Sag and Caohu Sag, and the main hydrocarbon source rock is Cambrian-Ordovician marine carbonate rock.