

Hydrocarbon charge history of main oil fields, western Qaidam Basin as revealed from an integrated fluid inclusion study

MENG QINGYANG^{12*}, ZHAO MENGJUN¹²,
ZHANG YONGSHU³, ZHOU FEI³, LU XUESONG¹²,
ZHENG YONGPING¹² AND LI XIULI¹²

¹Research Institute of Petroleum Exploration & Development,
PetroChina, Beijing, 100083, China
mqy5948@petrochina.com.cn(*)

²State key laboratory of enhanced oil recovery, Beijing,
100083, China

³Research Institute of Petroleum Exploration & Development,
Qinghai Oilfield, PetroChina, Dunhuang, 736202, China

Most of the oil fields in Qaidam basin were discovered in the western area. Three typical oil fields (Hongliuquan, Gasikule and Yingdong) are taken as examples to study their hydrocarbon charge history. This paper presents an integrated fluid inclusion study using fluid inclusion petrography, fluorescence spectroscopy, Quantitative Grain Fluorescence (QGF), Total Scanning Fluorescence (TSF), and FT-IR spectroscopy and microthermometry to investigate hydrocarbon charge history of three oil fields.

Three types of hydrocarbon inclusions are identified in the study area: namely (1) yellow fluorescing oil inclusions, (2) blue fluorescing oil inclusions and (3) gas inclusions, representing two episodes of oil charges and one gas charge possibly related to readjustment of the associated gases down dip. The first episode of oil charge is represented by the predominantly yellow fluorescing oil inclusions trapped prior to the quartz overgrowth, whereas the second episode is marked by the blue fluorescing fluid inclusions occurred after the precipitation of dolomite. Microthermometric data indicate that the two fluid inclusion assemblages have different homogenisation temperatures (T_h), corresponding to oil charge around 25 Ma and 10 Ma, respectively for the Gasikule and Hongliuquan oilfields, 10 Ma and 5 Ma, respectively for the Yingdong oilfield. On the basis of Quantitative Grain Fluorescence (QGF) and QGF on extract (QGF-E) and petroleum inclusion analyses, the palaeo oil/water contact was below the present oil/water contact in Hongliuquan and Gasikule oil fields, which demonstrate that early charged oil remigrated and formed present oil pools.