J Pet Environ Biotechnol 2016, 7:6 (Suppl)
http://dx.doi.org/10.4172/2157-7463.C1.026

Laboratory simulation of geochemical changes of crude oil during geological evolution

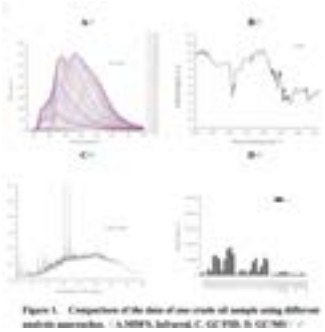
Chunyan Wang[1], **Jinliang Zhang**[2] and **Xinmin Fan**[1]
[1]Weifang University, China
[2]Beijing Normal University, China

Statement of the Problem: Unconventional resources have dominated growth in production over the past several years and have radically changed global oil markets. The geochemistry understanding of the unconventional oils has grown to a hot topic over the past several years. Polycyclic aromatic hydrocarbons (PAHs) play an important role in characterization, correlation, and differentiation of the crude oil in geochemical study, which have the merits of high resistance to weathering, thermal evolution and biodegradation. But because of the limited peak capability and low-resolution ratio in conventional chromatography related analysis of PAHs in heavy crude oil, it is extremely valuable to develop new analytical methods to pursue new aspects of chemical information of heavy and unconventional crude oil.

Aim: The purpose of this work is to characterize the geochemical changes of PAHs in oil samples during thermal and weathering evolution simulation experiments using MDFS, gas chromatography-flame ionization detector (GC-FID), chromatography-mass spectrometry (GC-MS), and infrared (IR) spectroscopy respectively.

Methodology & Theoretical Orientation: A new developed multi-dimensional-fluorescence spectroscopy (MDFS) has been proved to be particularly applicable to the analysis of the unconventional oil samples rich in PAHs.

Conclusion & Significance: Simulation experiments demonstrated the stability of medium and high ring of PAHs content in the heavy residual fractions under the boiling point from 180 to 481^{0}C. The effect of evaporative weathering on a series of diagnostic ratios of n-alkanes, PAHs and biomarkers was evaluated with two suites of weathered oil samples. No significant change was observed to the MDF spectra, while series of diagnostic ratios of biomarkers were absent due to thermal evolution or weathering of oils. All the results suggested that the MDFS is a promising method for unconventional oil characterization.



Wangcy@bnu.edu.cn