



# Editorial: New Advances and Challenges in Shale Oil Exploration

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## Editorial on the Research Topic

### New Advances and Challenges in Shale Oil Exploration

With the successful breakthrough in shale oil production, especially regarding medium to high maturity shale plays, there is now a potential resource addition to the world of energy resources. The geological theory, exploration, and development technology involved in shale oil resources have always been a hot topic. However, it remains challenging to efficiently and accurately assess shale oil reserves and identify sweet spot distribution. To improve efficiency and minimize risks in shale oil exploration and development, a special collection of high-quality original study and review articles into new advances and challenges in shale oil has been made in this Research Topic.

A total of 14 articles were received, 11 of which were accepted, that contain works on deposition, mineralogical, diagenesis, structure, geochemistry, and reservoir characterization, as well as a case study on shale oil plays such as Songliao, Ordos, Bohai Bay, and Sichuan Basin in China and the North Slope of Alaska. All articles accepted are within the scope of this Research Topic. Of the 14, 13 articles are original studies and one is a review article.

In the collected research, modeling of Tectonic-Thermal Evolution of Cretaceous Qingshankou Shale was reconstructed using the paleothermal indicator method. An improved method for 3D structural modeling using horizontal well data was developed by maximizing the utilization of horizontal well data and optimizing the quality of the structural model of shale reservoirs. In addition, shale oil enrichment was discussed from the perspective of paleosedimentary environment, lithofacies, and its heterogeneity. The influence of the diagenesis process as well as mineral composition on mudstone brittleness was proposed. The diagenetic transformation of clay minerals resulted in the increase of brittle components, thus illite and chlorite were considered to be brittle minerals for the first time. For shale oil sweet spot prediction, the role of soluble organic matter with different lithofacies, reservoir characteristics, and oil content in Hybrid Sedimentary Rocks were discussed in detail. Shale wettability and pores and surfaces are important factors that affect oil production. In this topic, the contact angle errors introduced by the pre-treatment of samples were discussed, and the wettability of the different lithofacies was characterized by an improved contact angle method. And the potential effects of the characteristics and properties of pores and surfaces on the fluid flow in shale formations were revealed. In addition to the above original studies, a review of mechanism, controls, and assessment on oil retention in shales were comprehensively investigated, and limitations and advantages of various methods were clearly noted. All of the research in this topic deepens the understanding of shale oil advances and challenges in shale oil exploration and provide a basis for further research.

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