

Quantitative Mineralogy and Clay Speciation for Oil & Gas Drilling Using X-ray Diffraction

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Abstract

PMET provides quantitative mineralogy and clay speciation to the mineral exploration and mining companies of the western hemisphere since 1987. More recently we provide similar services to the Oil & Gas industry.

Quantification of the minerals in the host rock and identification of the clay species are important factors in estimating availability of hydrocarbons and for planning the recovery stage.

The clay minerals e.g. kaolinite, smectite, illite, chlorite, etc. are ubiquitous in the targeting rocks of oil and gas exploration. Clay minerals in source rocks are important for quality evaluation of hydrocarbon generation, expulsion and migration.

Clay minerals help concentrate organic matter by adsorption and subsequently act as catalysts to generate petroleum. For clay minerals in reservoir rocks, their presence has an important impact upon reservoir properties such as porosity and permeability and upon those measured physical data that are used to evaluate reservoir quality.

Clay mineral information is used to decipher the burial diagenetic process and reveal the pore type and pore evolution. Even though they are usually considered to be detrimental to reservoir quality because they can plug pore throats and can be easily compacted, other diagenetic processes may enhance porosity through the forming of secondary porosity through providing porosity by clay dissolution, creating micropores in clays and coating of chlorite on grains to prevent quartz cementation. (excerpted from Clay Minerals from the Perspective of Oil and Gas Exploration by Shu Jiang)

This poster will provide examples of quantitative mineralogy and clay analysis results produced by PMET, Inc. for the mineral mining and the oil and gas industry. Mr. Shannon will be available to discuss in detail how this data is generated.