

## ***Geochemical methods and assessment of oil shale resources***

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Oil shale has emerged worldwide as a major unconventional resource due to changes in economic and technological considerations. These deposits were formed in a variety of marine, continental, and lacustrine environments and range in age from Cambrian to Tertiary. They vary widely in organic content and oil yield. Traditional assessment techniques typically rely on small-scale batch retort methods like modified Fischer assay. Rapid open-system programmed pyrolysis methods like Rock-Eval can also be used to screen samples and typically provide good correlations with Fischer assay results. Although these bulk assay methods are useful for grading oil shale in terms of yield during laboratory and/or surface retort, they provide limited compositional information to evaluate different types of oil shale. Furthermore, they operate within a much higher thermal regime, up to 500-600°C, compared to modern in-situ conversion methods conducted at maximum temperatures of only ~370°C. In the present study, results from traditional assessment methods are compared to closed-system hydrous pyrolysis experiments (270–365°C) using different sub-facies of the Green River Shale from the Uinta Basin, Utah. These results provide some interesting insights regarding the progressive evolution of hydrocarbon phases and their changing molecular composition during thermal decomposition of oil shale. Comparisons will also be made to other in-situ pyrolysis methods to illustrate the advantages and limitations of the variety of geochemical assessment techniques.