

# Compositional Modeling of Oil to Gas Cracking – Compositional Modeling of Asphaltene and Resin Thermal Degradation

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How deep can we drill before we hit the oil floor? What is the thermal deadline of crude oil under various geological conditions? These are great challenges for exploration geologists and basin modelers. Accurate assessment of oil thermal stability is essential for evaluating the economics of deep petroleum reserves and accumulation. A significant amount of effort has been put into addressing this problem and considerable progress has been made; however, uncertainties in the kinetic parameters related to degradation are still large.

Fundamental details of the reaction networks, uniqueness of the kinetic parameters, and the relative importance of specific reaction mechanisms remain as critical unsolved issues. This paper describes a multi-component kinetics model for a specific oil sample from Thailand where the reaction network, reactant coefficients, and activation energies have been determined and calibrated based not only on cracking of the whole oil, but also on sub-fractions of the oil. Details of the thermal cracking of the asphaltene and the resin fractions isolated from the oil will also be discussed.