Concentrate Diamondoids of Crude Oil of Barnett Shale in Fort Worth Basin of Texas

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Diamondoids, a class of petroleum hydrocarbons, are rigid, fused-ring alkans with diamond-like structures and unique thermal stabilities. Diamondoids are more stable than most hydrocarbons and, once formed are resistant to thermal and biological destruction. Although they are widely distributed in crude oils and source rocks, especially at high and over mature samples, the concentrations of these compounds are often pretty low. Therefore it is significant to find a novel method to concentrate the diamondoids from the crude oil. The first step of the concentration is to apply distillation in vacuum system to get the lower boiling compound from the crude oil and partially concentrate the diamondoids. Then molecular sieving is adopted to remove n-alkanes and parts of branched alkanes. After getting the extraction from molecular sieve, the sample is run into Gas Chromatography with standard Tetracosane-d50. The result shows that the concentration of diamonoids has been improved almost twice. Once the concentration of diamondoids has been improved, isotope analysis will be applied to characterize the crude oil of Barnett Shale with the help of diamondoids. Maturity, biodegradation, depositional environment and oil/source rock correlation will also be explored by the diamondoids in the future project. Some crucial geological and geochemical aspects concerning petroleum formation and evolution in the basin will be studied in detail with these novel maturity parameters.