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# Shale Oil and Gas Resources in Organic Pores of the Devonian Duvernay Shale, Western Canada Sedimentary Basin based on Petroleum System Modeling

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## Abstract:

Shale-hosted hydrocarbons is regarded as an important unconventional resource around the world. So far, huge emphasis has been put on the contribution of organic pores to self-source and self-reservoir hydrocarbon systems. This study systemically reveals the contribution of organic pores to hydrocarbon potential in the Duvernay Shale through restoring thermal maturity evolution, modeling hydrocarbon generation and expulsion in the Duvernay Formation, analyzing absorption capacity variation with TOC and modeled pore pressure, determining free-gas storage capacity with calculated organic porosity and correction of adsorbed gas, and calculating in-place shale oil and gas volumes with volumetric method. The Duvernay Shale reached “oil window” and “gas window” about 70-80 Ma and 50 Ma ago, respectively. Significant hydrocarbon generation (20% TR) began and terminated (95% TR) at Ro of 0.65% and 1.85%, respectively. Gas generation rates increased dramatically from Ro of 1.1%, while the instantaneous HC<sub>1-4</sub> expulsion reached peak at Ro of 1.66%, the difference between

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