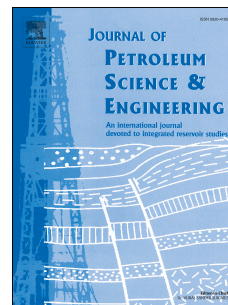


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The effect of pressure and hydrocarbon expulsion on hydrocarbon generation during pyrolysis of continental type-III kerogen source rocks

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1 **The effect of pressure and hydrocarbon expulsion on hydrocarbon generation during**
2 **pyrolysis of continental type-III kerogen source rocks**

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13 **ABSTRACT:** In order to define the role of water and lithostatic pressure in petroleum formation of
14 continental type-III kerogen source rocks, semi-closed hydrous pyrolysis experiments were
15 conducted with 50 - 1200 bar water pressure and 125 - 2000 bar lithostatic pressure under 480 °C.
16 This investigation is very helpful for the explorations of shale gas and deep petroleum in China.
17 Increasing water pressure from 50 to 325 bar can't affect the yields of gaseous hydrocarbon, oil
18 and bitumen, but increasing of water pressure leads the more oil and less gaseous hydrocarbons
19 generated from continental type-III kerogen in 325 - 1200 bar water pressure range under
20 semi-closed condition. The decreasing yields of gaseous hydrocarbon, dryness of gaseous
21 hydrocarbon and hydrogen primary confirms that increasing water pressure may promotes the
22 primary reaction but decreases the cracking magnitude of oil. The decreasing values of S_2 、HI、
23 H/C in the pyrolysed samples confirm that high water pressure can promote the efficiency of
24 hydrocarbon generation from continental type-III kerogen, while maturation of kerogen
25 correspondingly increases showing by increasing values of VR and Tmax. In 125–625 bar
26 lithostatic pressure range, oil cracking and primary reaction from type-III kerogen may be
27 promoted for the decreasing effect of expelling hydrocarbon. The increasing of hydrogen and
28 gaseous hydrocarbon yields also confirms that cracking of oil is enhanced during this pressure
29 range. The decreasing trends of oil and gaseous hydrocarbons yields indicates that hydrocarbon
30 generation rate was reduced by the high lithostatic pressure in 625 to 2000 bar pressure range. The
31 increasing values of S_2 , HI, H/C, and decreasing values of VR, Tmax of pyrolysed samples
32 confirm the retardation effect of highlithostatic pressure on the efficiency of hydrocarbon
33 generation and maturation. Besides, the results also indicate that expelling hydrocarbons strongly

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