

Supporting Information

Study on plugging material and plugging mechanism of crude oil sand water filter pipe

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Instrumentation

The X-ray diffraction (PXRD) patterns were recorded on a Rigaku Smartlab3 X-ray Powder Diffractometer equipped with a Cu sealed tube ($\lambda = 1.54178 \text{ \AA}$) in the range of 5° to 50° at room temperature. The Fourier transform infrared spectrometry (FT-IR) analyses were measured on a Nicolet 5700 spectrophotometer in the range $400\text{-}4000 \text{ cm}^{-1}$. ^1H NMR and ^{13}C NMR spectra were recorded on 400 MHz (Bruker) instrument, CDCl_3 (7.26 ppm for ^1H NMR, 77.16 ppm for ^{13}C NMR) was used as a reference.

1. PXRD spectra of Blockage

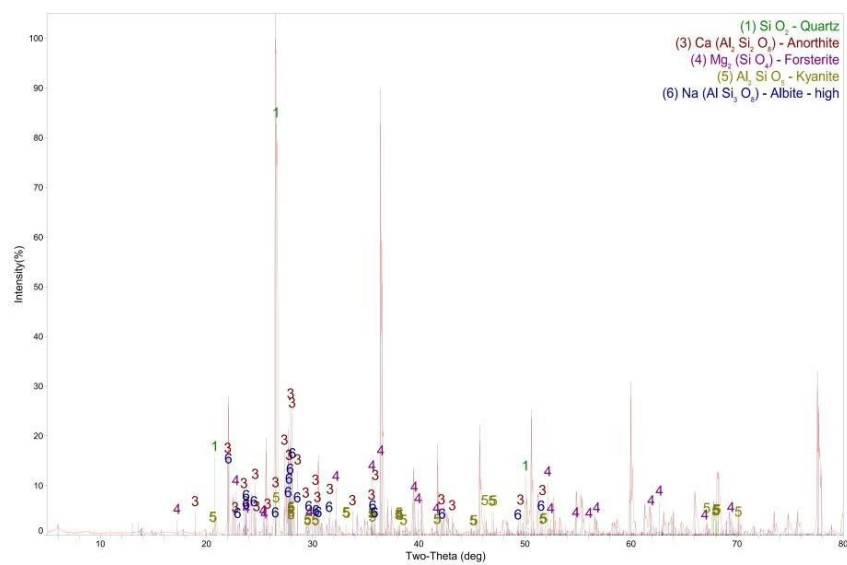


Figure S1. Blockage PXRD powder diffraction pattern

2. FT-IR spectra of Blockage

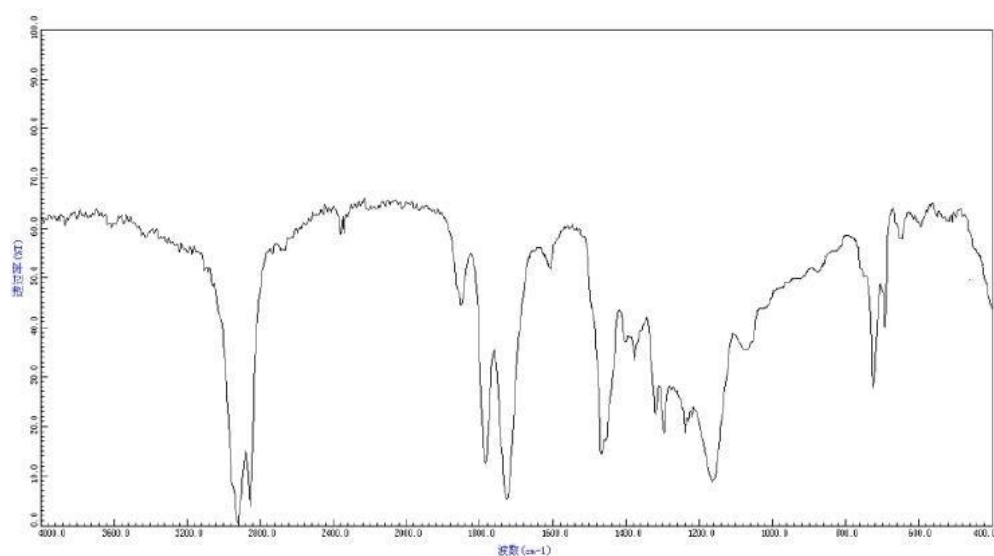


Figure S2. FT-IR spectra of oil pipeline blockage

3.Copies of the NMR Spectra

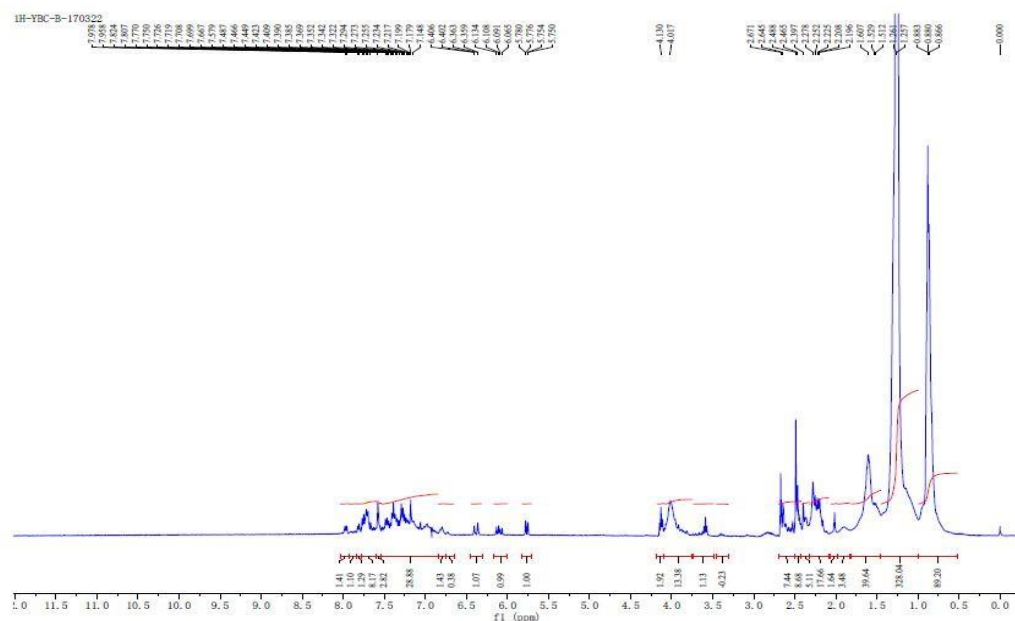


Figure S3. Oil production pipeline blockage ^1H NMR test results

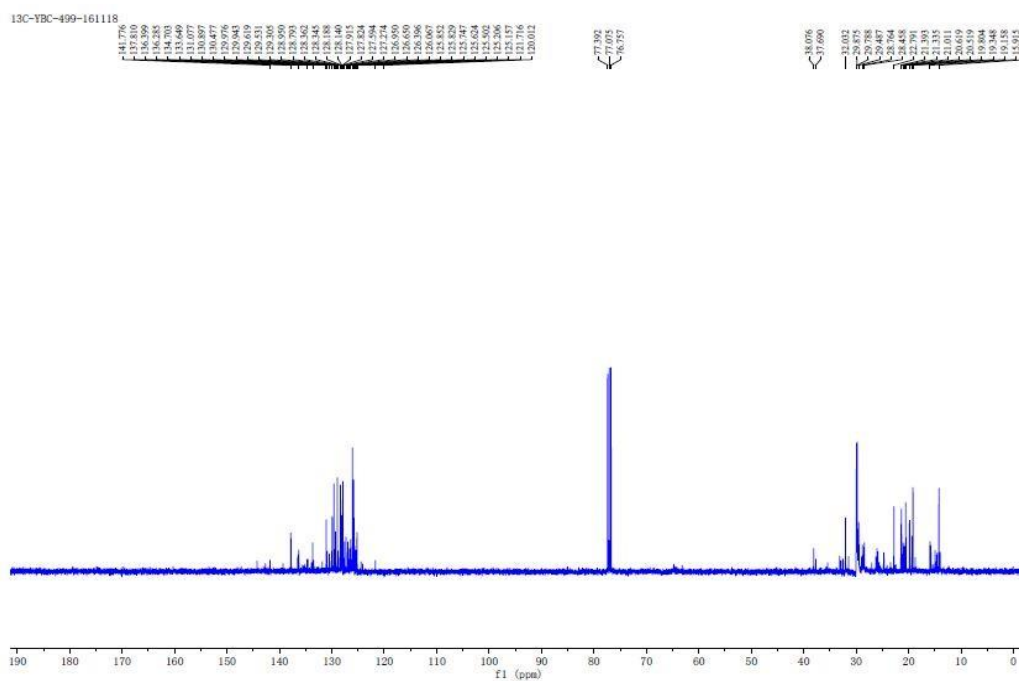


Figure S4. Oil production pipeline blockage ^{13}C NMR test results

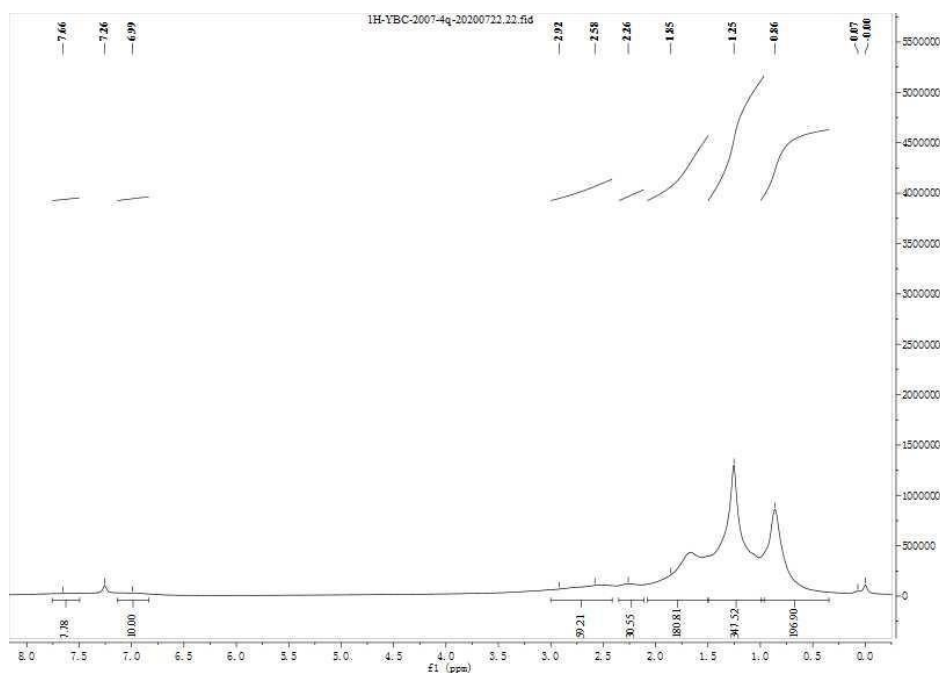


Figure S5. 4-zone blockage ¹H NMR test results

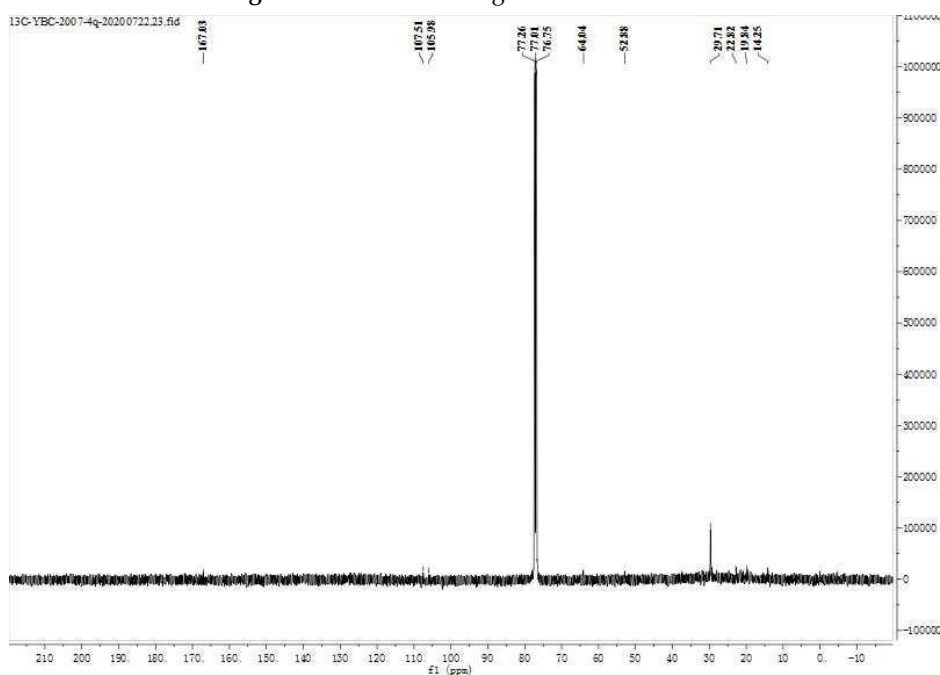


Figure S6. 4-zone blockage ¹³C NMR test results

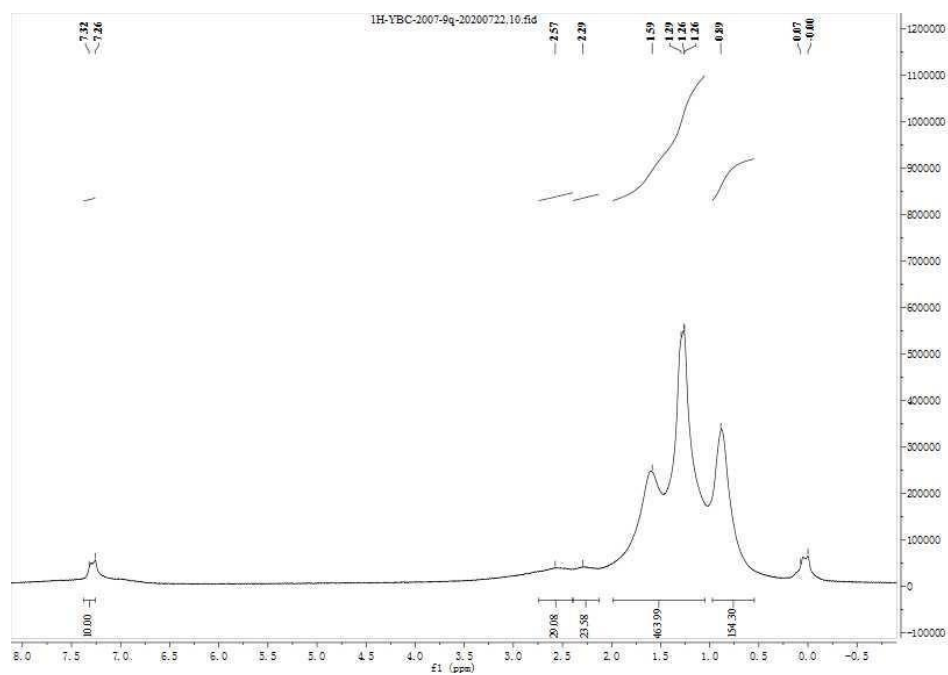


Figure S7. 9 zone blockage ^1H NMR test results

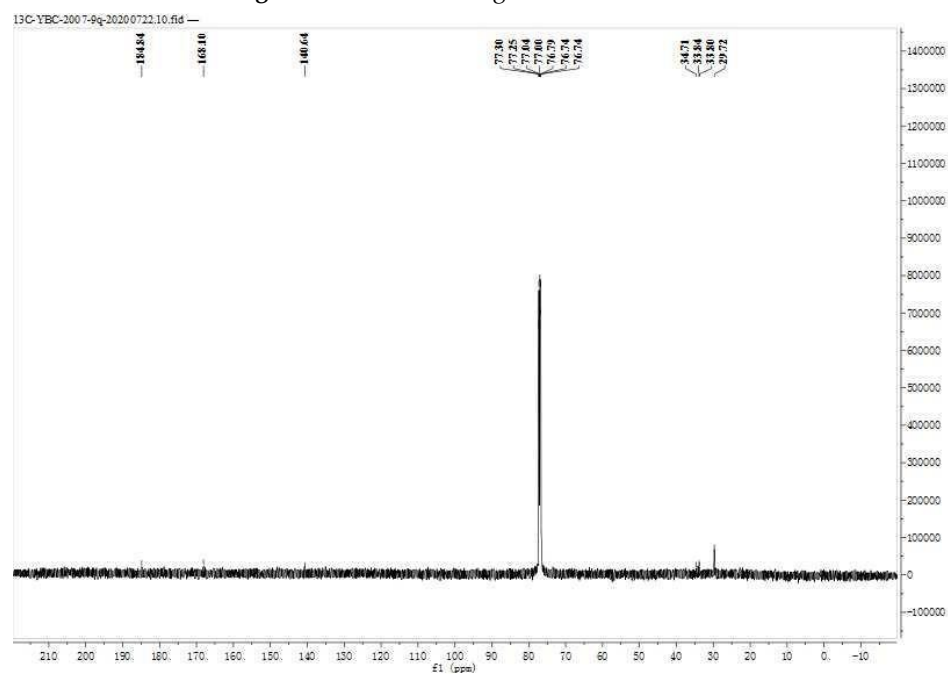


Figure S8. 9 zone blockage ^{13}C NMR test results

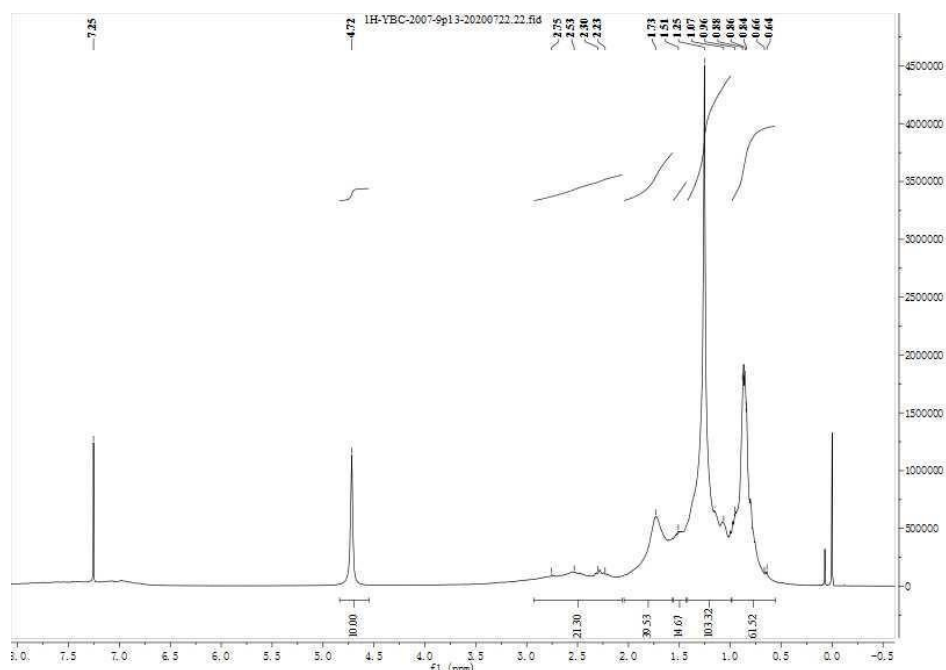


Figure S9. 9P13 well crude oil ^1H NMR test results

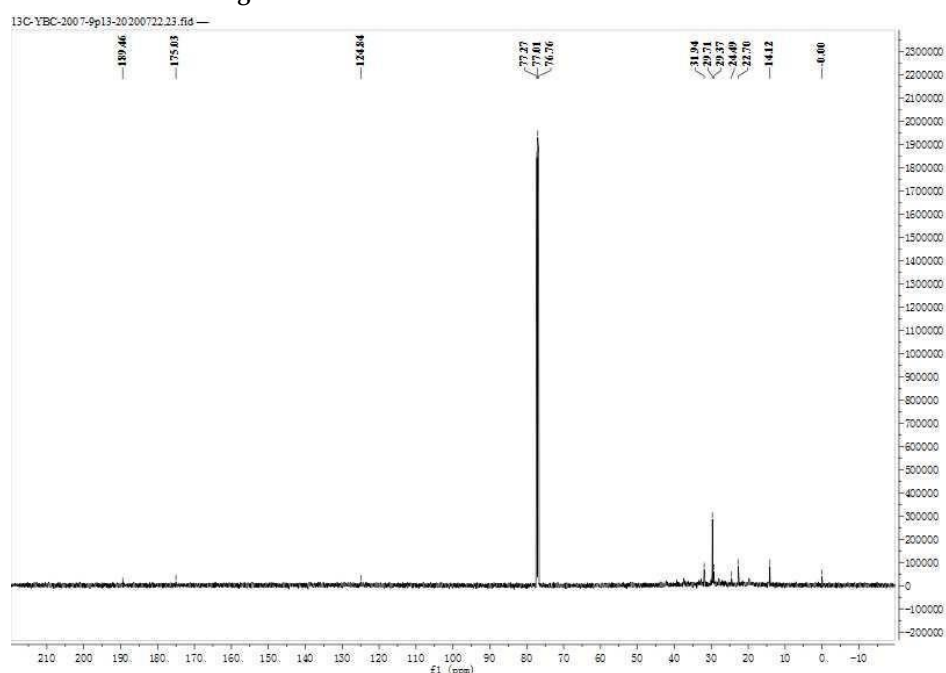


Figure S10. 9P13 well crude oil ^{13}C NMR test results

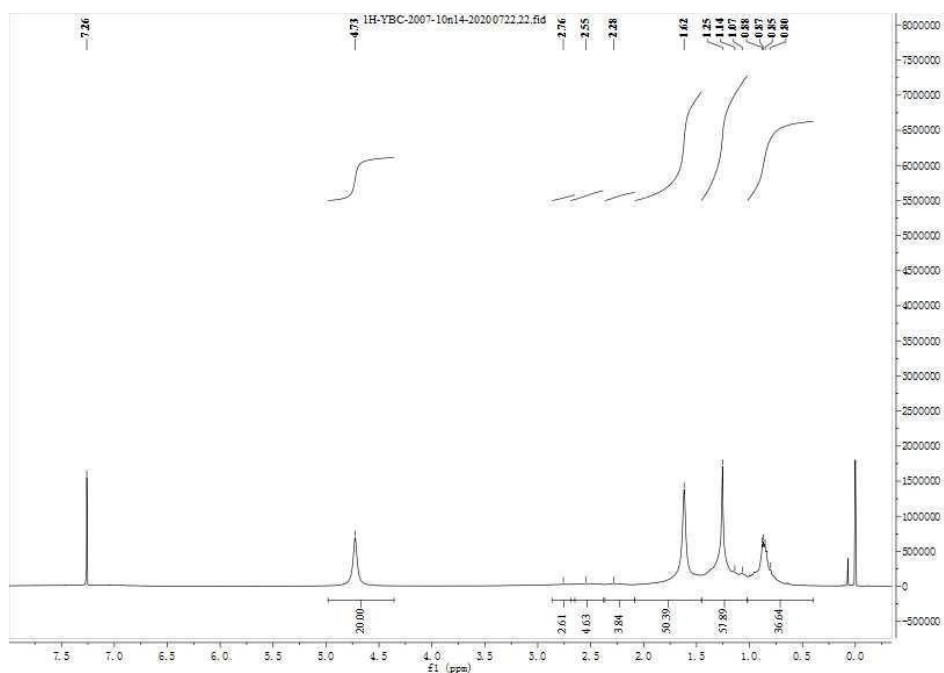


Figure S11. 10N14 well crude oil ^1H NMR test results

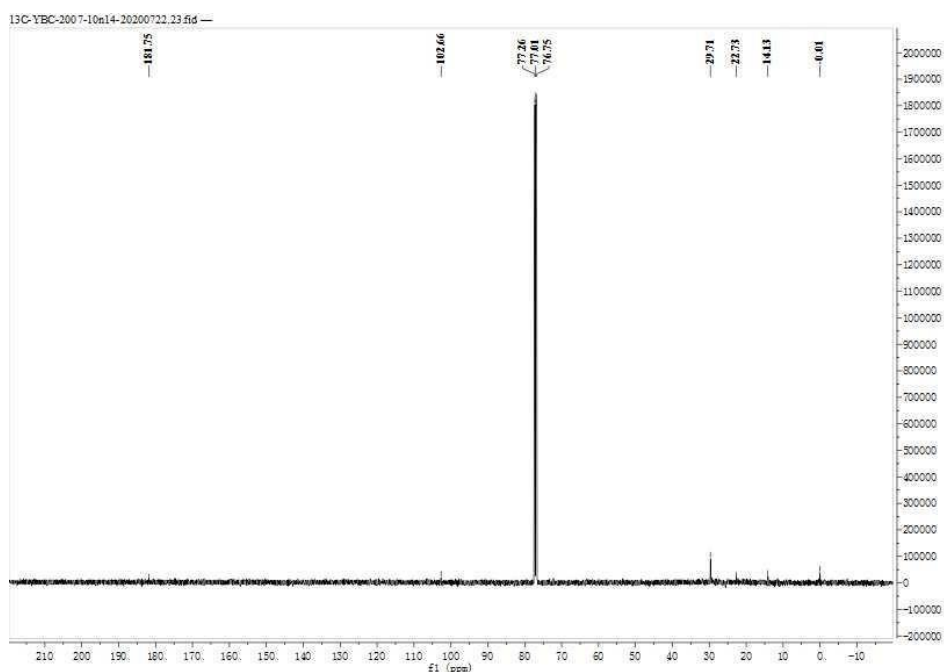


Figure S12. 10N14 well crude oil ^{13}C NMR test results

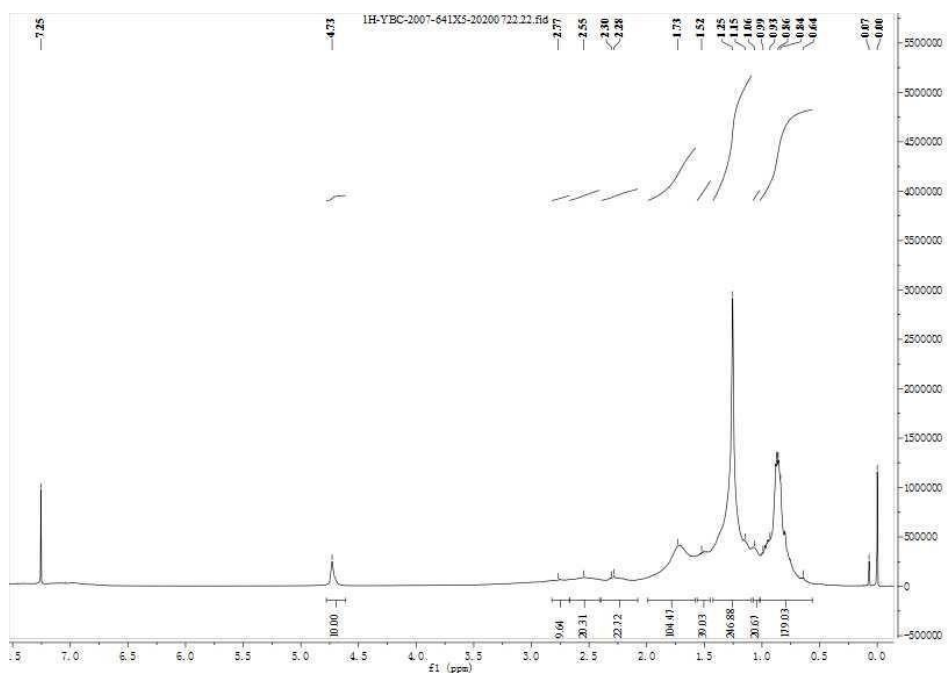


Figure S13. 641X5 well crude oil ^1H NMR test results

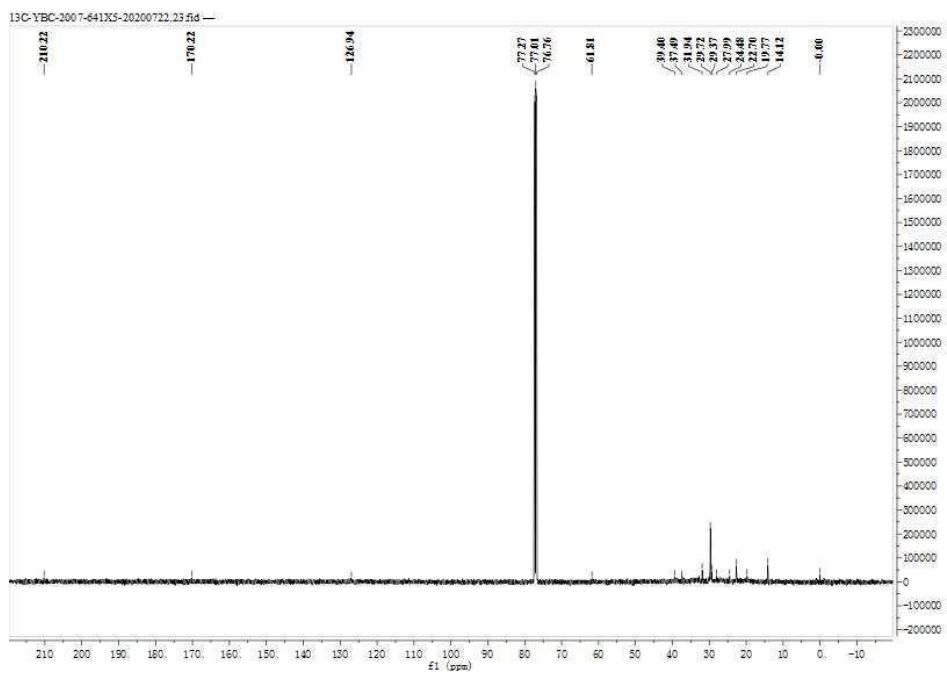


Figure S14. 641X5 well crude oil ^{13}C NMR test results

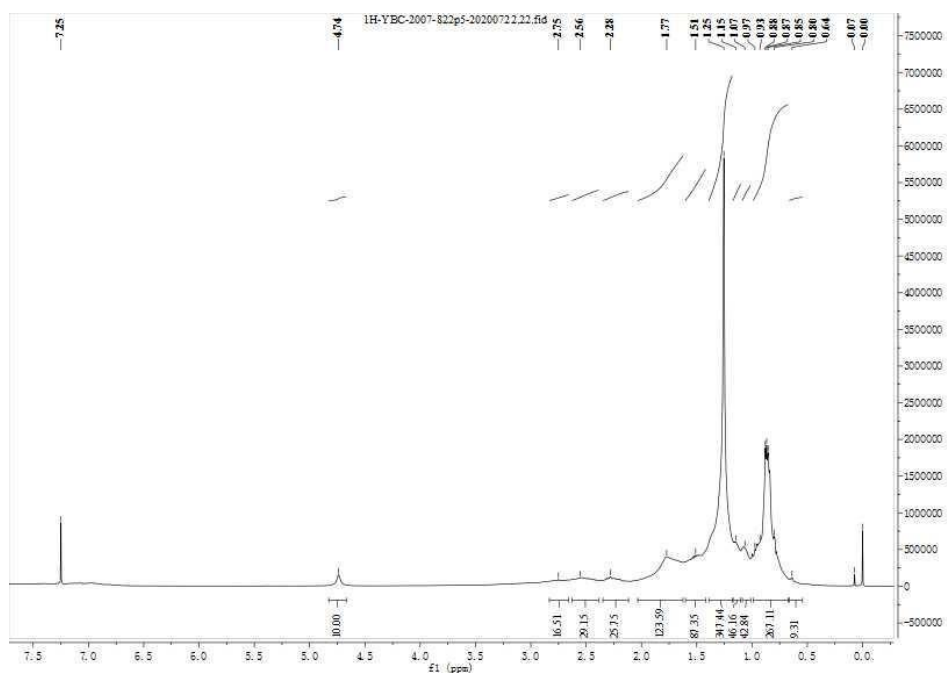


Figure S15. 822P5 well crude oil ^1H NMR test results

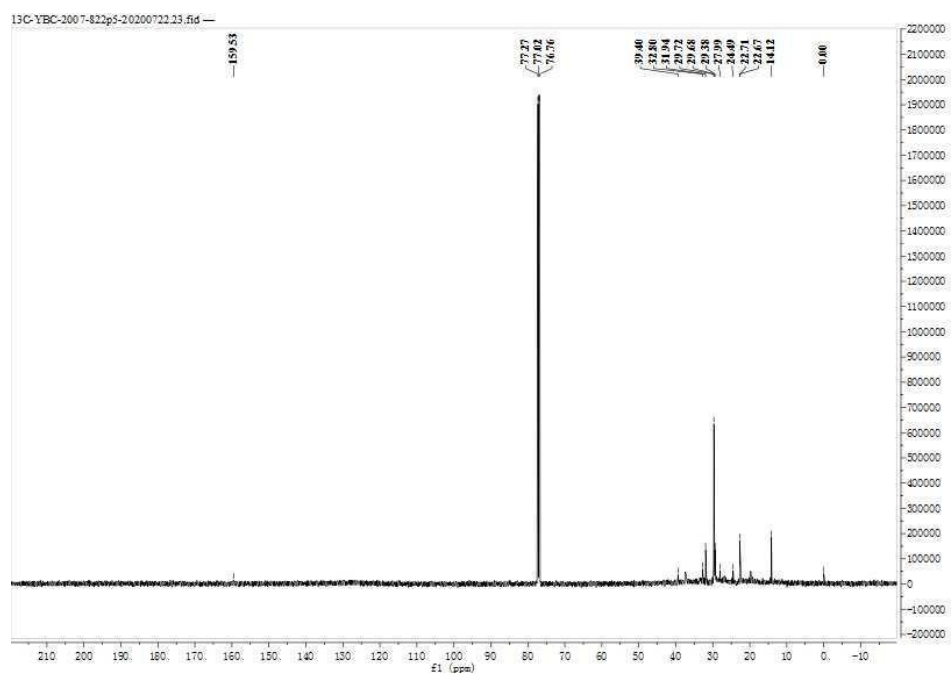


Figure S16. 822P5 well crude oil ^{13}C NMR test results

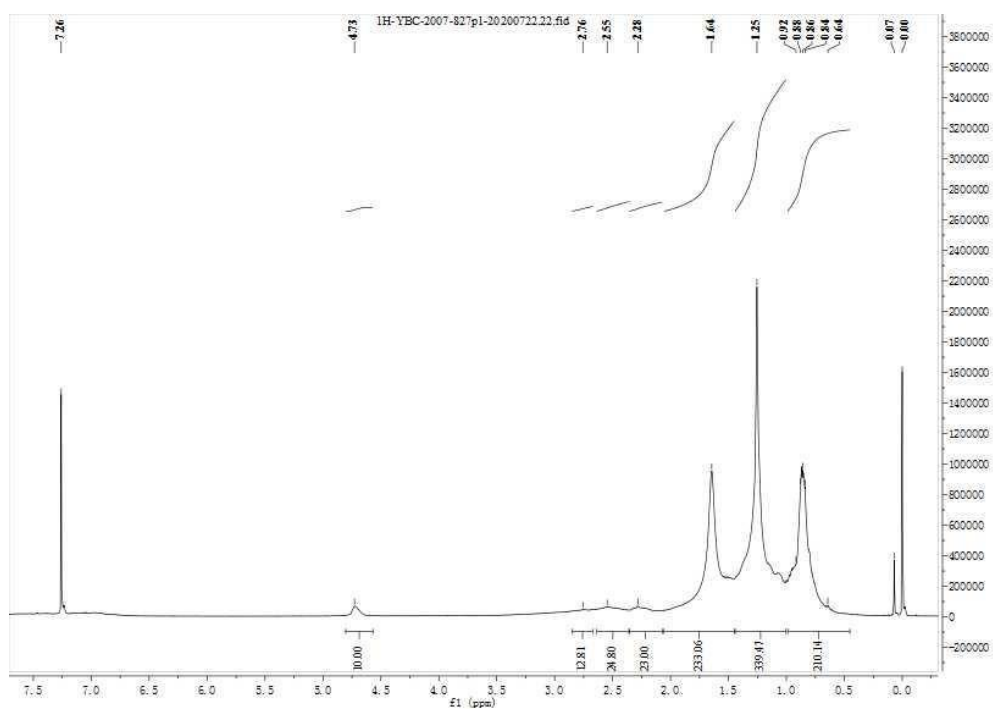


Figure S17. 827P1 well crude oil ^1H NMR test results

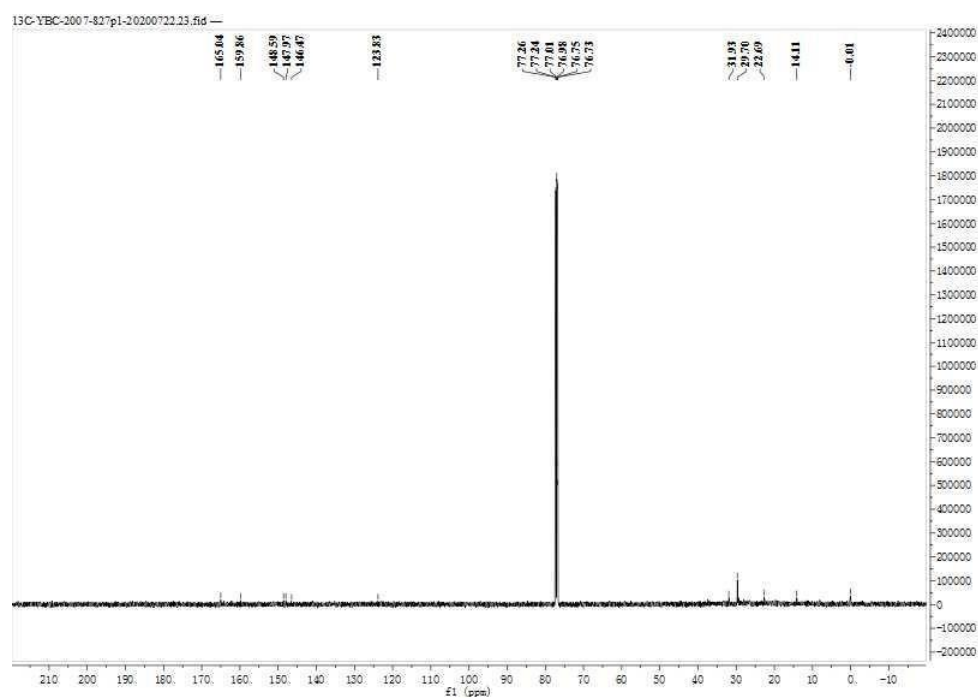


Figure S18. 827P1 well crude oil ^{13}C NMR test results