Supplementary file

Contribution of different shale storage spaces to recovery rate and mechanisms of oil mobilization during huff-n-puff

Jianguang Wei[1,2,3], Anlun Wang[1,2,3], Rui Wang[1,4,*], Ying Yang[1,2,3], Xiaoqing Zhao[1,2,3], Xiaofeng Zhou[1,2,3]

[1] *State Key Laboratory of Continental Shale Oil, Northeast Petroleum University, Daqing 163318, P. R. China*

[2] *Key Laboratory of Continental Shale Hydrocarbon Accumulation and Efficient Development (Northeast Petroleum University), Ministry of Education, Northeast Petroleum University, Daqing 163318, P. R. China*

[3] *Institute of Unconventional Oil & Gas, Northeast Petroleum University, Daqing 163318, P. R. China*

[4] *Exploration and Development Research Institute of Daqing Oilfield Co. Ltd, Daqing 163712, P. R. China*

E-mail address: weijianguang@163.com (J. Wei); law8912@163.com (A. Wang); dq_wangrui@petrochina.com.cn (R. Wang); yyainngg@126.com (Y. Yang); zhaoxiaoqing@nepu.edu.cn (X. Zhao); zhxf_cup@163.com (X. Zhou).

[*] Corresponding author (ORCID: 0009-0009-6118-5436)

Wei, J., Wang, A., Wang, R., Yang, Y., Zhao, X., Zhou, X. Contribution of different shale storage spaces to recovery rate and mechanisms of oil mobilization during huff-n-puff. Capillarity, 2025, 15(1): 12-24.

The link to this file is: https://doi.org/10.46690/capi.2025.04.03

Design of experimental plan for imbibition, and basic parameters of rock cores.

Table S1. Design of experimental plan for imbibition, and basic parameters of rock cores.

No.	Well No.	Core No.	Length (cm)	Diameter (cm)	Permeability (mD)	Type	Scheme
1	Guye10HC	2-2-4	4.28	2.48	0.453	Millimeter level sand bar	Distilled water
2	Guye 10HC	4-11-6	4.04	2.45	0.009	Millimeter level sand bar	Alkaline solution
3	Guye 10HC	2-3-1	4.09	2.49	0.054	Millimeter level sand bar	GJ surfactant
4	Guye 10HC	4-10-7	4.10	2.45	0.035	Millimeter level sand bar	Guanidine gum
5	Guye 10HC	1-17-6	6.06	2.49	0.121	Millimeter level sand bar	Acid solution
6	Guye 10HC	1-16-4	4.11	2.50	0.063	Millimeter level sand bar	Petroleum sulfonate
7	Guye 10HC	1-16-5	4.10	2.52	0.021	Millimeter level sand bar	Alkylbenzene sulfonate
8	Guye 10HC	1-14-5	3.97	2.53	0.047	Millimeter level sand bar	Slick water + acid
9	Guye 10HC	2-3-8	4.19	2.51	0.083	Millimeter level sand bar	GJ surfactant + acid
10	Guye 10HC	2-3-7	4.14	2.55	0.053	Millimeter level sand bar	Slick water

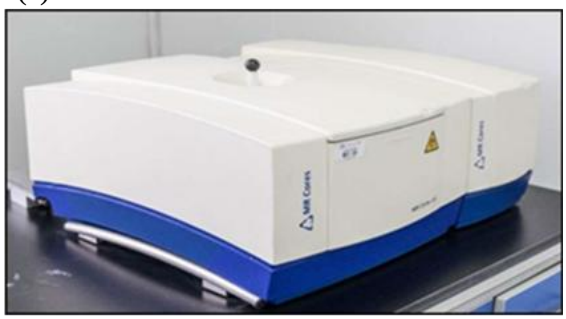
11	Guye 10HC	1-18-5	4.27	2.5	0.006	Rich bedding shale	Distilled water
12	Guye 10HC	1-19-4-2	4.18	2.48	0.007	Rich bedding shale	Alkaline solution
13	Guye 10HC	4-13-1	6.05	2.50	0.009	Rich bedding shale	GJ surfactant
14	Guye 10HC	1-19-4-1	4.14	2.48	0.007	Rich bedding shale	Guanidine gum
15	Guye 10HC	1-12-2	6.61	2.50	0.025	Rich bedding shale	Acid solution
16	Guye 10HC	1-6-4	4.14	2.50	0.018	Rich bedding shale	Petroleum sulfonate
17	Guye 10HC	1-17-5	6.07	2.49	0.018	Rich bedding shale	Alkylbenzene sulfonate
18	Guye 10HC	1-12-3	6.54	2.50	0.011	Rich bedding shale	Slick water + Acid solution
19	Guye 10HC	1-18-4	4.16	2.49	0.376	Rich bedding shale	GJ surfactant + Acid solution
20	Guye 10HC	2-2-8	4.27	2.50	0.009	Rich bedding shale	Slick water
21	Guye 10HC	1-2-1	6.49	2.48	0.096	Millimeter level sand bar	Slick water
22	Guye 10HC	1-2-2	6.51	2.49	0.042	Millimeter level sand bar	CY absorbent
23	Guye 10HC	1-13-2	6.43	2.48	0.032	Millimeter level sand bar	GJ surfactant

24	Guye 10HC	1-9-2	6.42	2.49	0.029	Millimeter level sand bar	Sand carrying fluid
25	Guye 33	2-82-2	6.09	2.52	0.004	Millimeter level sand bar	CO_2
26	Guye 10HC	118-23	6.37	2.53	0.015	Millimeter level sand bar	Slick water -10MPa
27	Guye 10HC	118-31	6.27	2.53	0.031	Millimeter level sand bar	CY absorbent -10MPa
28	Guye 33	2-82-1	6.09	2.52	0.009	Millimeter level sand bar	GJ surfactant-10MPa
29	Guye 10HC	167-16	6.32	2.53	0.097	Millimeter level sand bar	Sand carrying fluid -10MPa
30	Guye 10HC	1-2-3	6.46	2.48	0.109	Millimeter level sand bar	CO_2-10MPa

The main experimental equipment and fluids used in the experiment.

The main experimental equipment and fluids used in the experiment is shown in Fig. B-1.

(a)



(b)

(c)

(d)

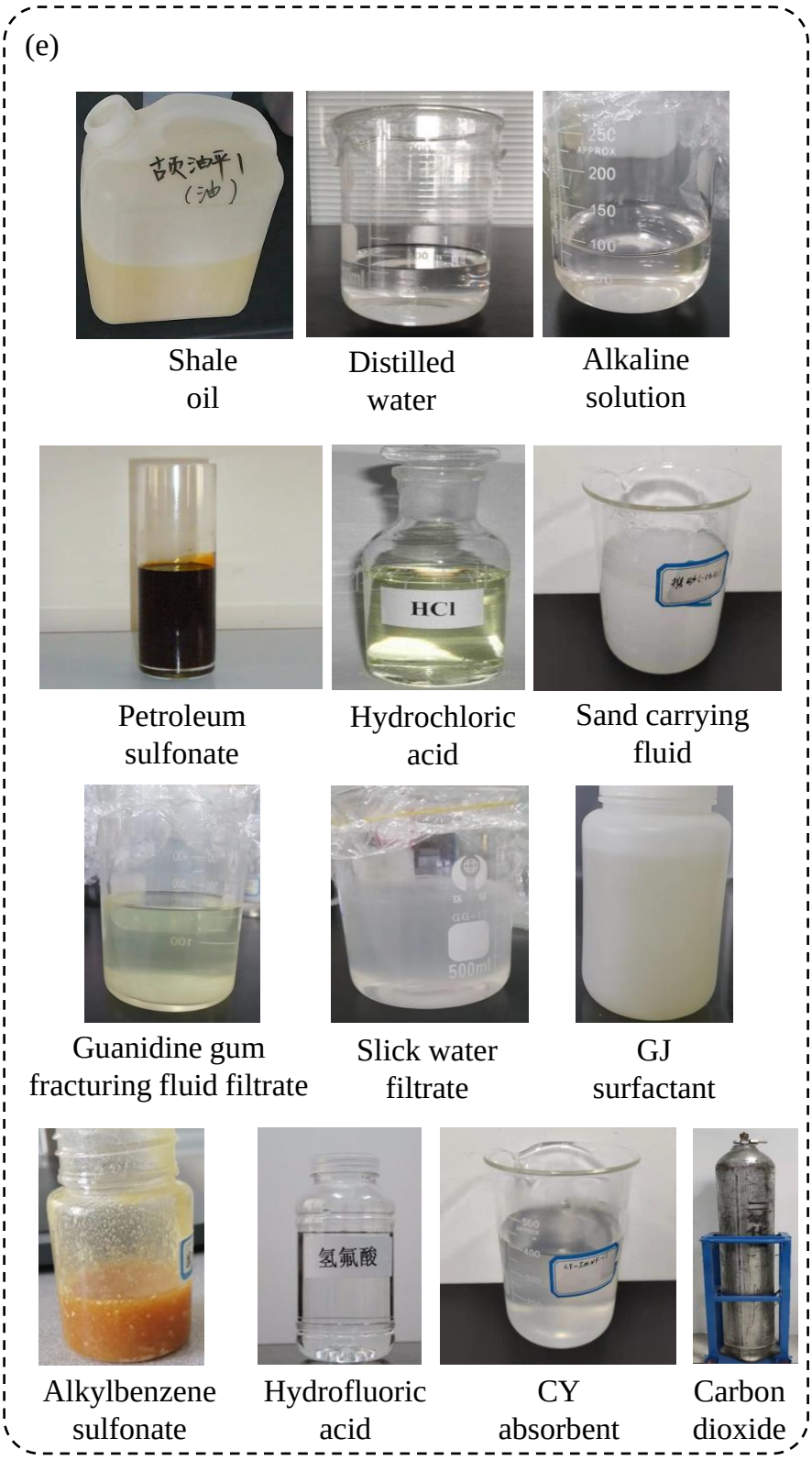


Fig. S1. The main experimental equipment and fluids used in the experiment: (a) High frequency (23MHz) 2D nuclear magnetic resonance core analyzer, (b) overburden porosity permeability tester, (c) dynamic imbibition experimental device, (d) high temperature and high pressure injection device and (e) experimental imbibition fluids.