Supporting Information

Demulsification-Enabled Entanglement Anchoring Prepared Superlubrication Hydrogel for Antifouling of Vessel Surfaces

*Shijia He, Shuhang Deng, Li Wang, Jingjuan Lai, Jing Yi, Dong Xiang, Chunxia Zhao, Hui Li, Xuezhong Zhang, Dong Li, Guilong Yan, and Yuanpeng Wu**

[a]The Center of Functional Materials for Working Fluids of Oil and Gas Field, School of New Energy and Materials, Southwest Petroleum University, Chengdu 610500, Sichuan, China.

[b]Sichuan Engineering Technology Research Center of Basalt Fiber Composites Development and Application, State Key Laboratory of Oil and Gas Reservoir Geology and Exploitation, Southwest Petroleum University, Chengdu 610500, Sichuan, China.

** Corresponding authors.*
E-mail: ypwu@swpu.edu.cn

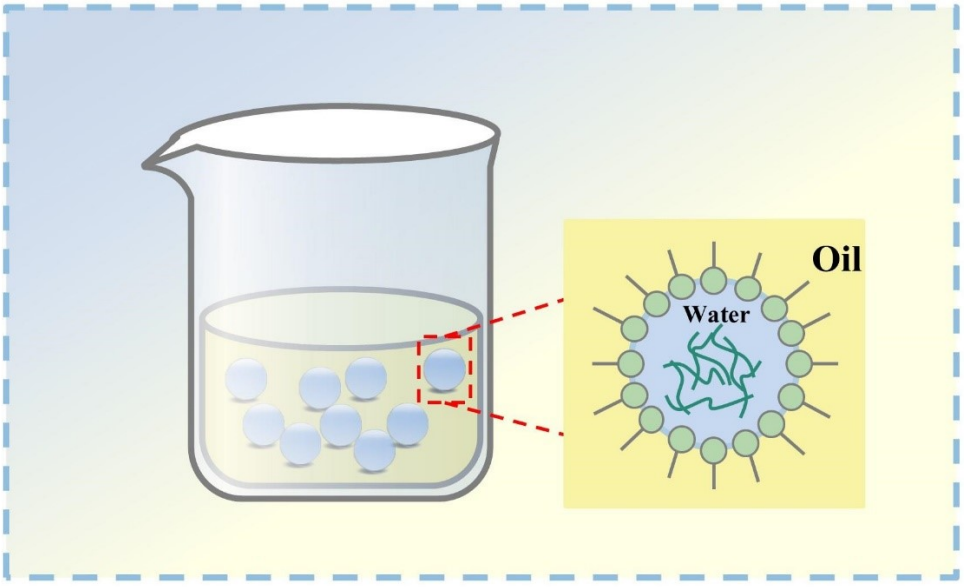


Figure S1. Water-in-oil emulsion schematic diagram.

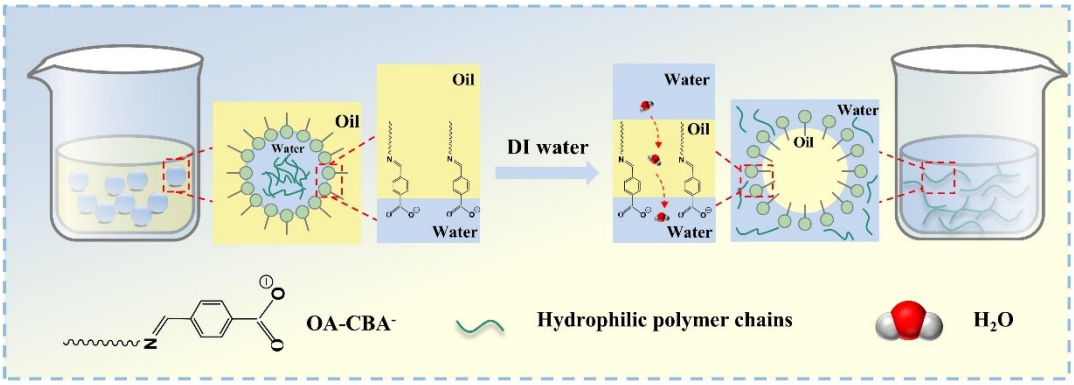


Figure S2. Water-in-oil emulsion demulsification process

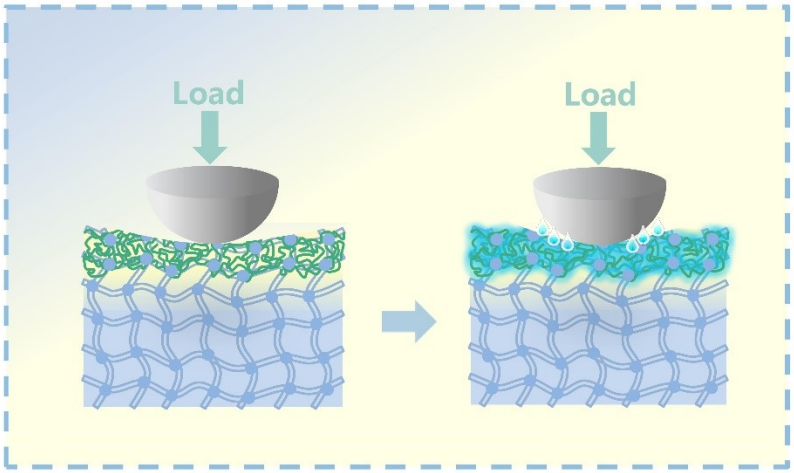


Figure S3. Hydrated lubrication mechanism diagram.

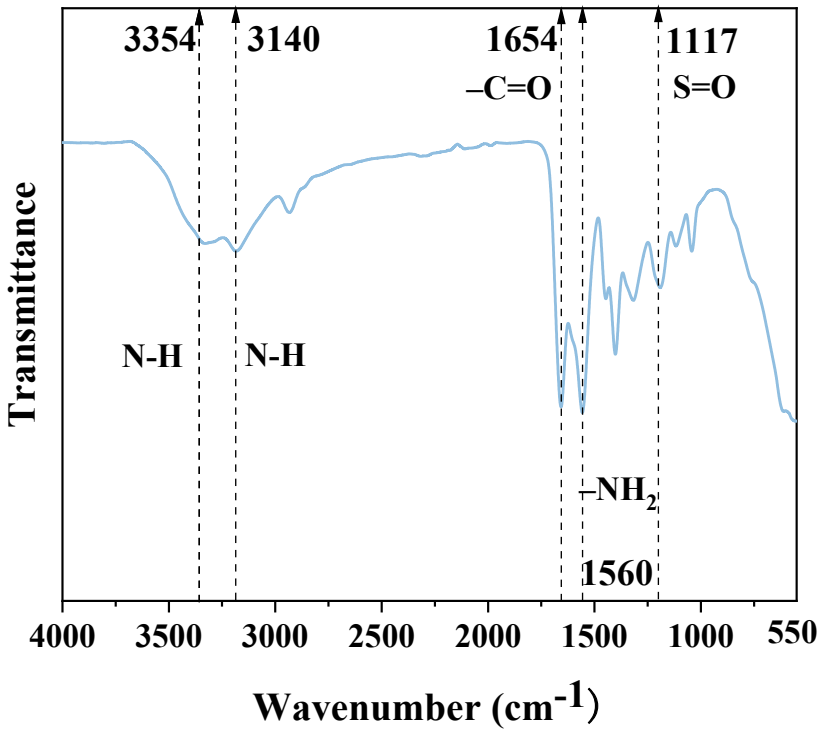
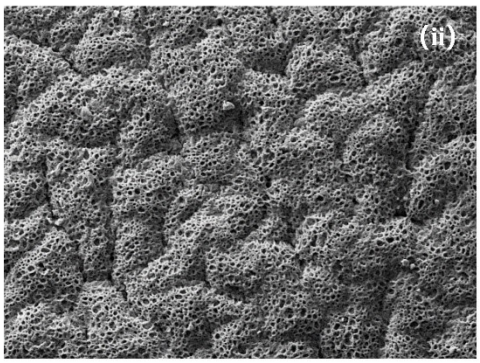


Figure S4. Fourier transform infrared spectroscopy of water-in-oil emulsion.



Map Sum Spectrum		
Element	Wt%	Atomic %
C	56.65	66.96
N	1.68	1.70
O	28.98	25.71
S	12.70	5.62
Total:	100.00	100.00

Map Sum Spectrum		
Element	Wt%	Atomic %
C	57.40	65.50
N	3.59	3.52
O	33.32	28.55
S	5.69	2.43
Total:	100.00	100.00

Figure S5. SEM and element content of the upper and lower surfaces of $MEDH_4$ hydrogel.

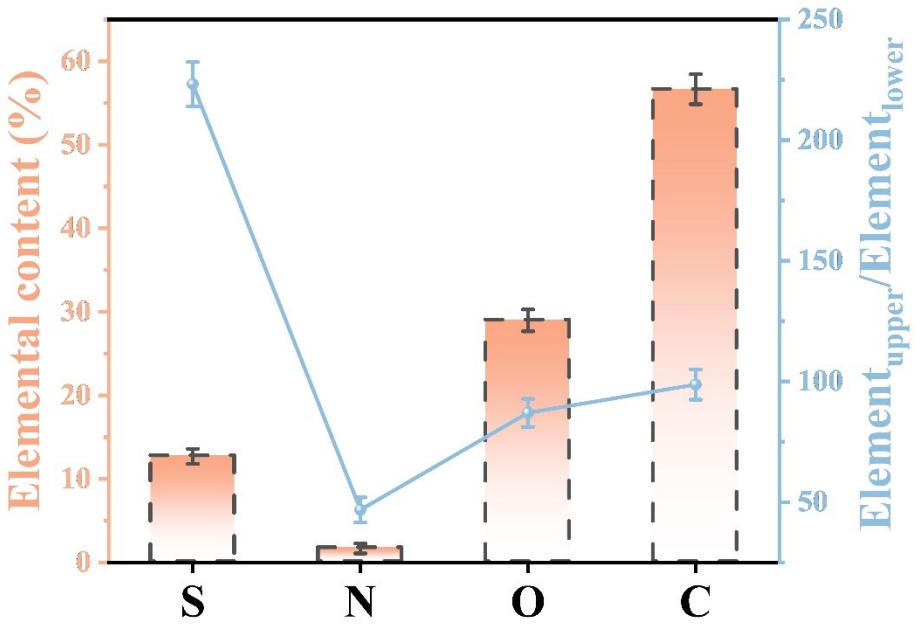


Figure S6. The contents of S, N, O, and C elements, as well as the ratio of upper-layer to lower-layer elements, have been analyzed.

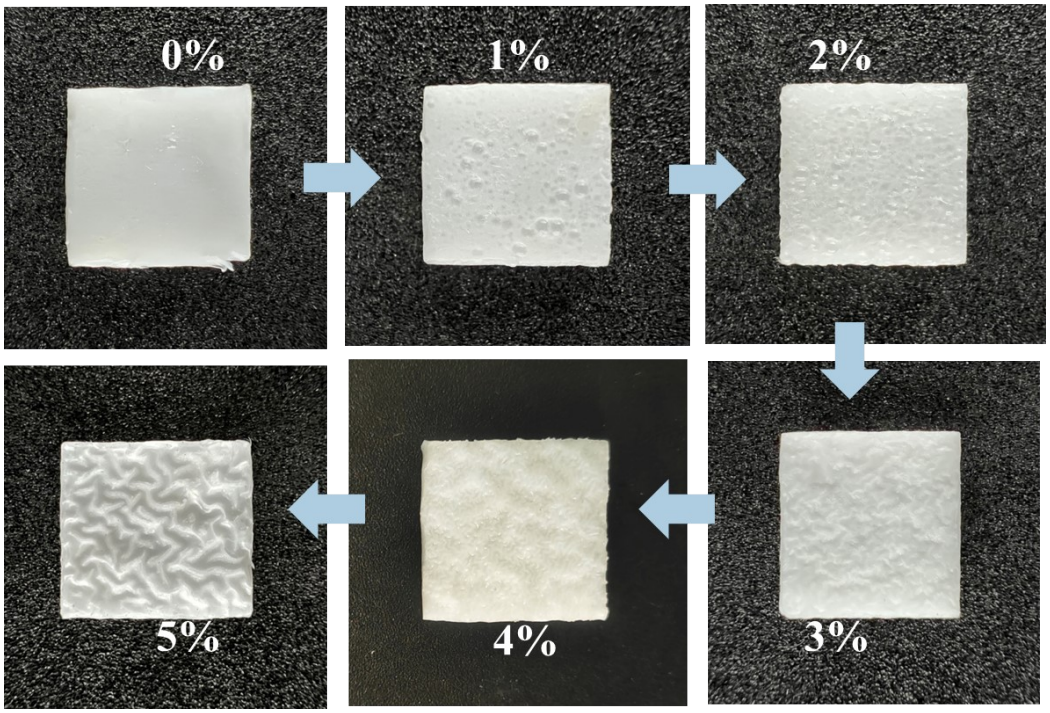


Figure S7. Surface morphology images of MEDH hydrogel at different emulsion ratios.

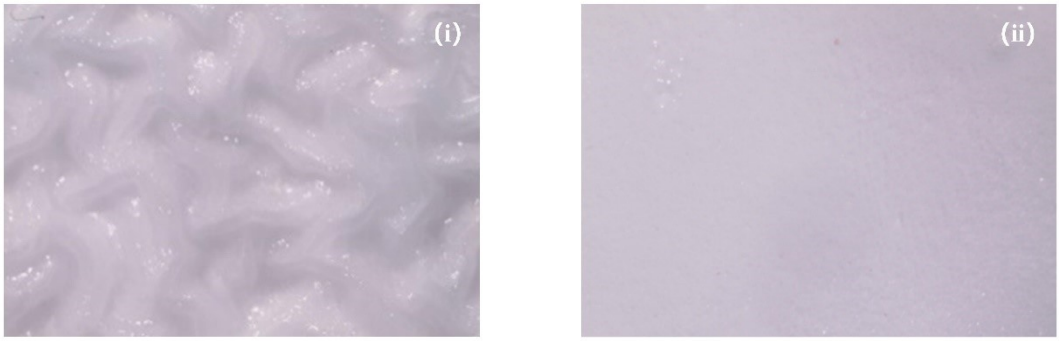


Figure S8. Optical microscope images of the upper surface of MEDH4 and PMA hydrogels.

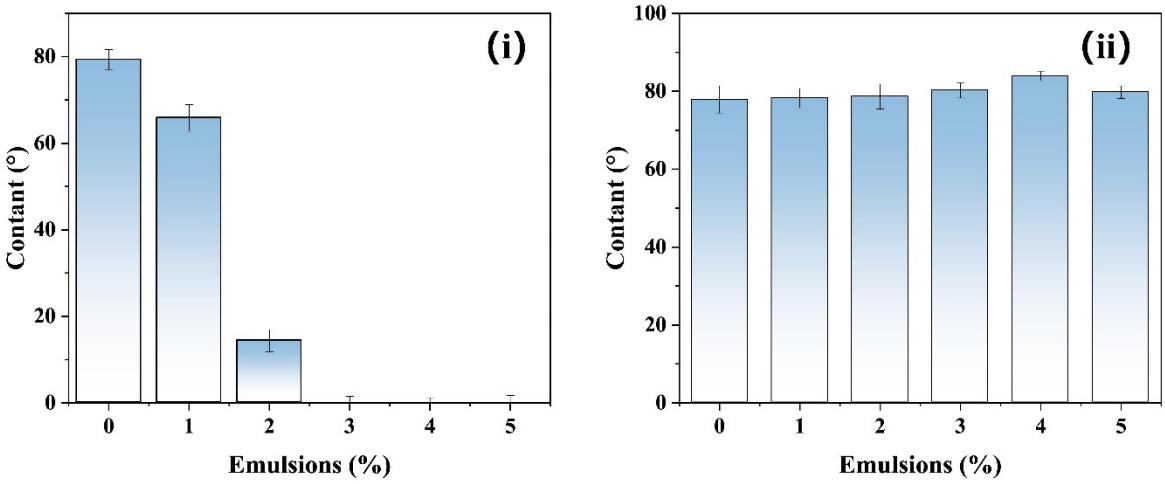


Figure S9. The water contact angle of the upper and lower surfaces of the MEDH hydrogel under different emulsion ratios.

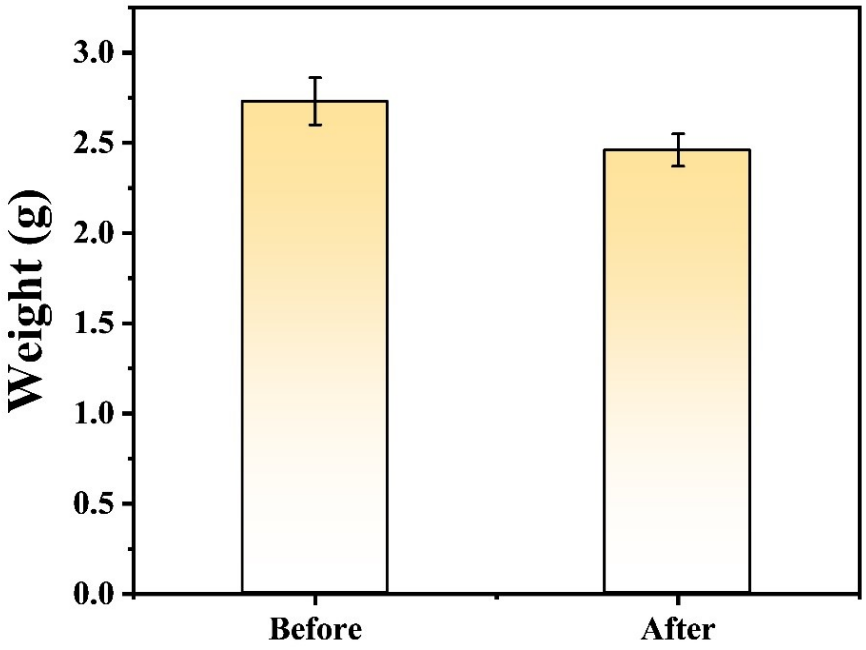


Figure S10. The weight of $MEDH_4$ before and after 50,000 friction and wear cycles

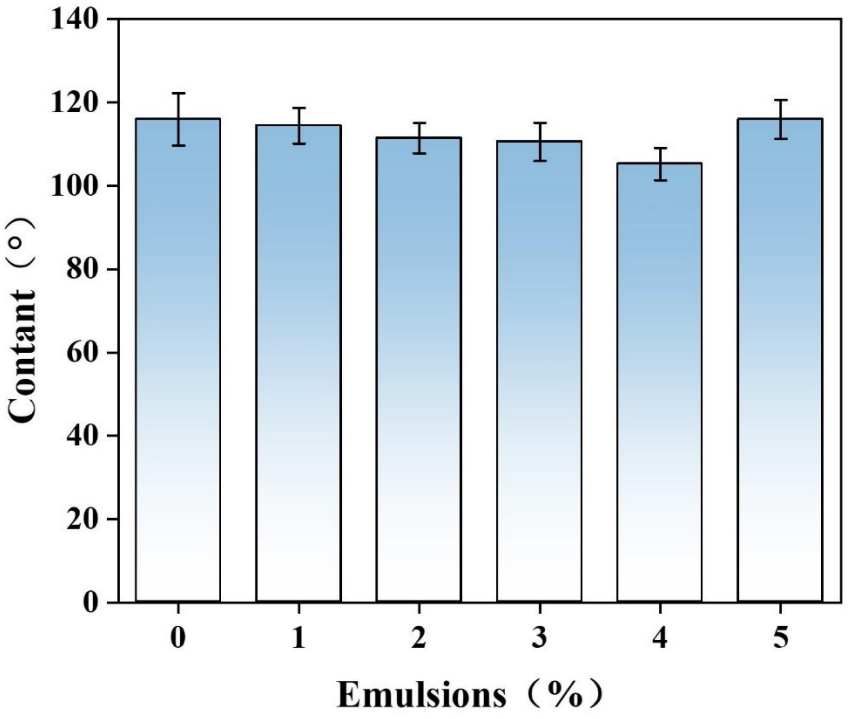


Figure S11. underwater oil contact angle of hydrogel.

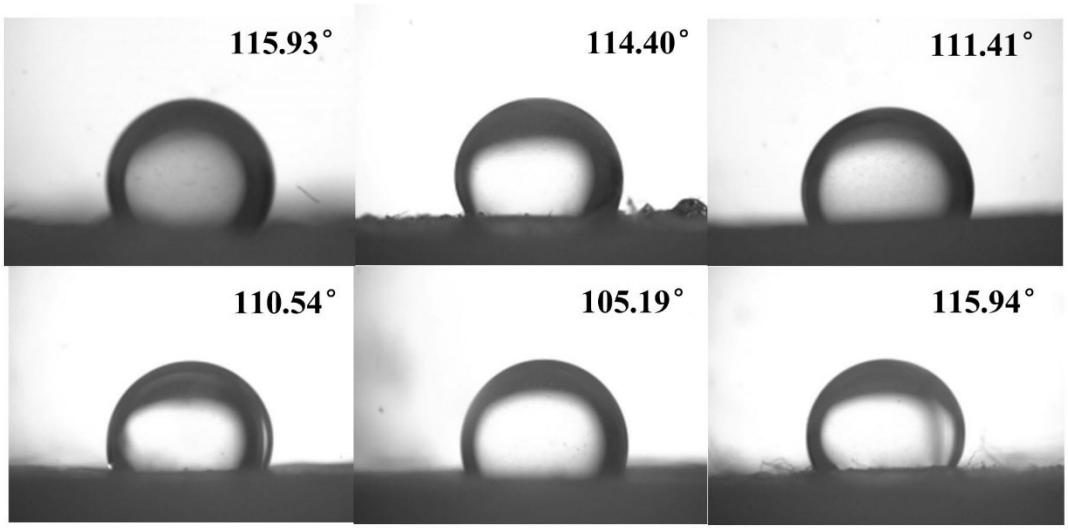


Figure S12. underwater oil contact angle images of hydrogels.

Table S1 . Comparison of lubrication and antifouling properties of $MEDH_4$ hydrogel and previous hydrogels

	COF	Cycles	Load	Strength	Anti-Oil	Preparation method	References
CZP Nano Mesh	/	/	/	/	√	in-situ solution corrosion	[1]
CDs-PVA/PAAm	0.3	/	0.3N	0.958 MPa	/	Dynamic covalent network + CDs doping	[2]
CS/AM/AA-Fe^{3+}	0.02~0.08	/	10N	2.88 MPa	/	UV polymerization[3] + leaching Fe^{3+}	[3]
PVA/PAAm	0.15	1800	5 N	/	/	UV-initiated polymerization + casting + Silanized Ti_6Al_4V	[4]
Ca^{2+}/alginate hydrogel	/	/	/	/	√	Coating, ionic cross-linking and Li^+ substitution	[5]
P(AA-co-AM)	0.98	/	10 mN	59kPa	√	UV curing + secondary UV curing+Template Copying	[6]
P(AAm-co-SPMA)/PDMS	0.175	18,000	10N	0.7 MPa	√	Chemical modification of surfaces + Free Radical Polymerization	[7]
Fe^{3+}-PAA/PAM	0.009	5000	5N	7.5 MPa	/	UV curing + Secondary crosslinking in Fe^{3+} solution	[8]
PNIPAm/EYL-Laponite	0.056	1000	1N	0.61 MPa	/	one-step method	[9]
This Work*	0.00615	50000	30N	137 kPa	√	one-step method	/

reference

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