



ROBUST LIQUID-REPELLING NANOFILAMENT COATINGS FOR ENHANCED OIL FLOW, REDUCED BIOFOULING, SCALING AND CORROSION WITHIN OIL WELLS

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Animal surfaces for inspiration



Journal of The Royal Society Interface 2015



Biointerphases 2021
Nature Communications 2020
Proceedings of the Royal Society B 2021



Biointerphases 2019



Biology Letters 2022
Journal of Physical Chemistry Letters 2022

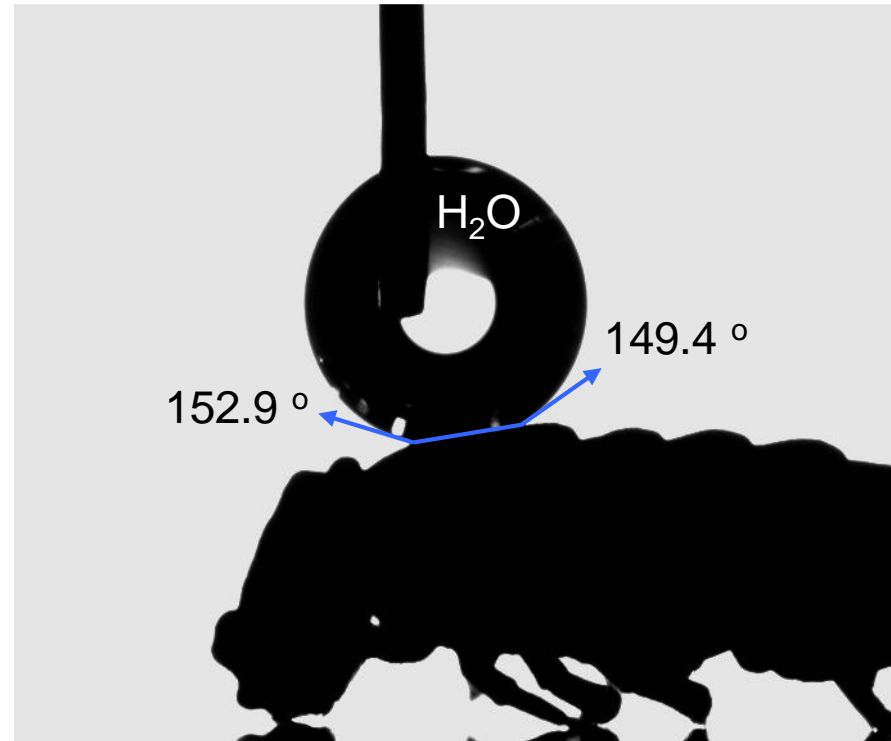


ACS Applied Materials & Interfaces 2020

Water contacts are important when you are small...



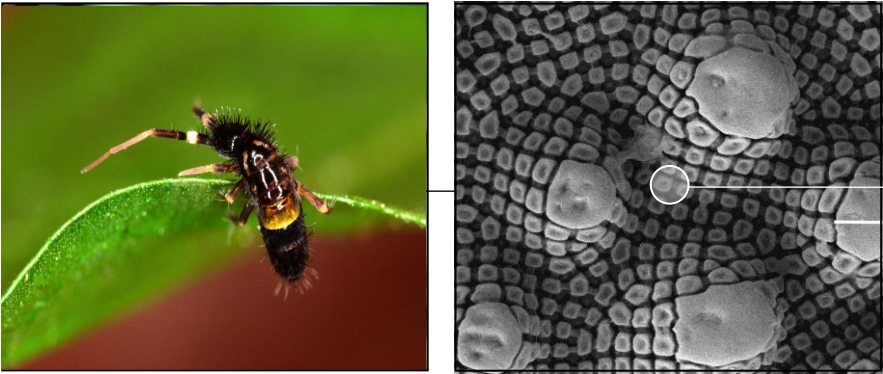
Springtails breath through skin



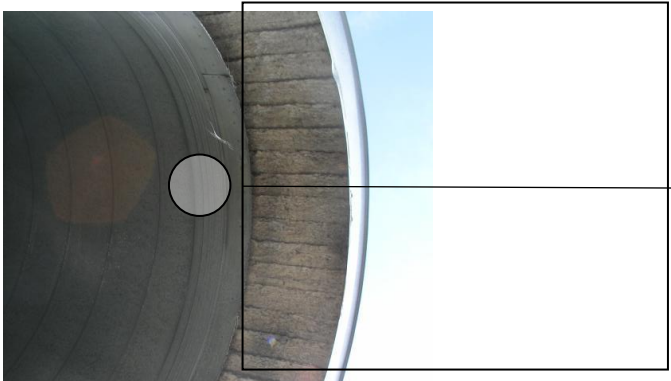
Skin repels liquids

Using the tricks of spring tails

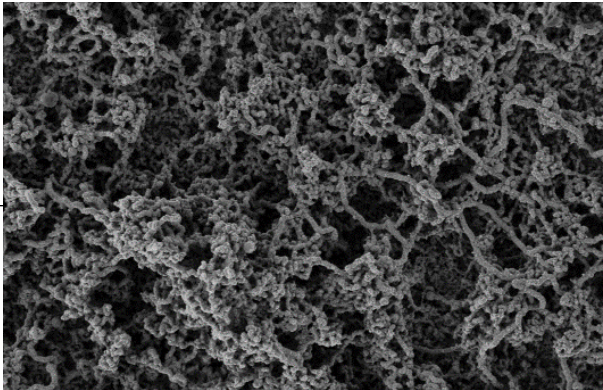
Mimic water repellency of spring tails...



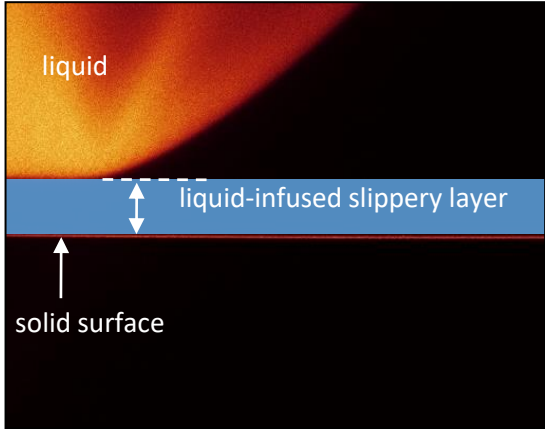
...and apply them to well surfaces...



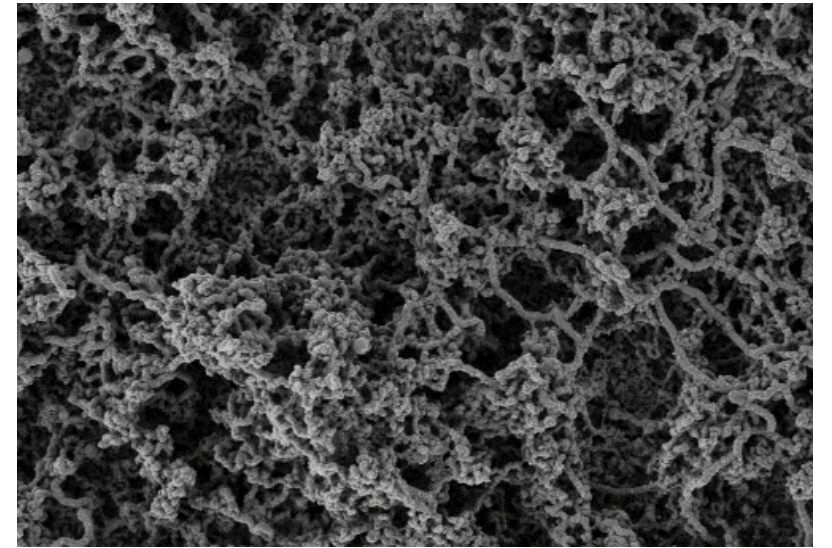
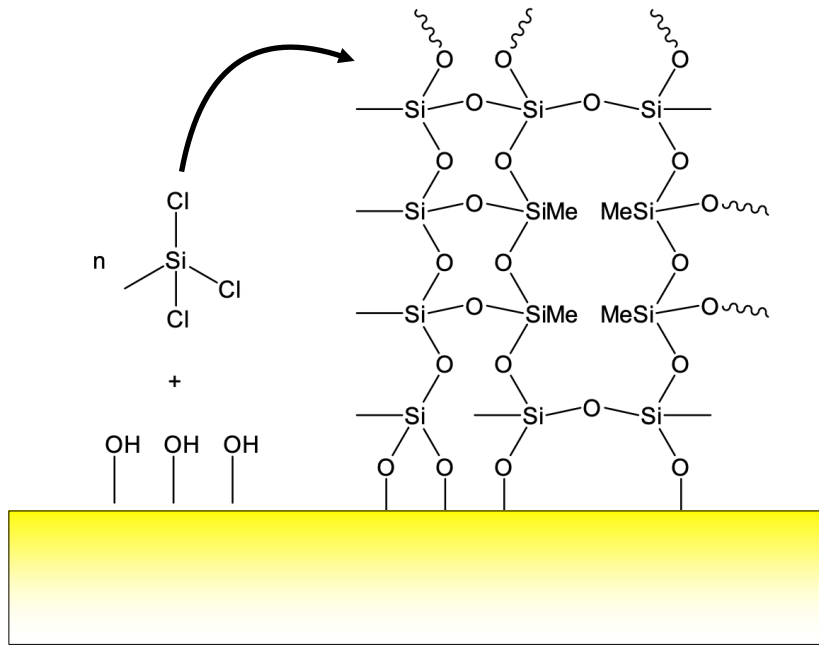
Nanofilaments



Liquid not in contact with nanofilament surface



- ...to improve oil flow by drag reduction
- ...to prolong maintenance intervals by self-cleaning
- ...to minimize wall wetting and scaling
- ...to reduce biofouling

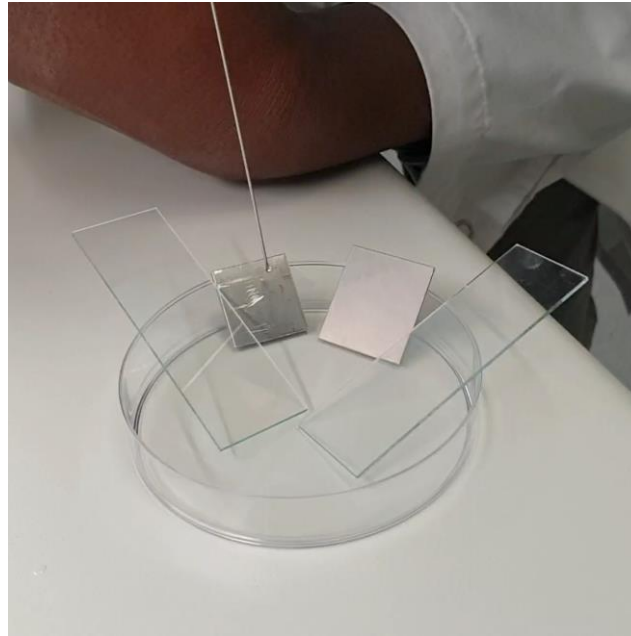


These nanofilaments mimic the skin of springtail.

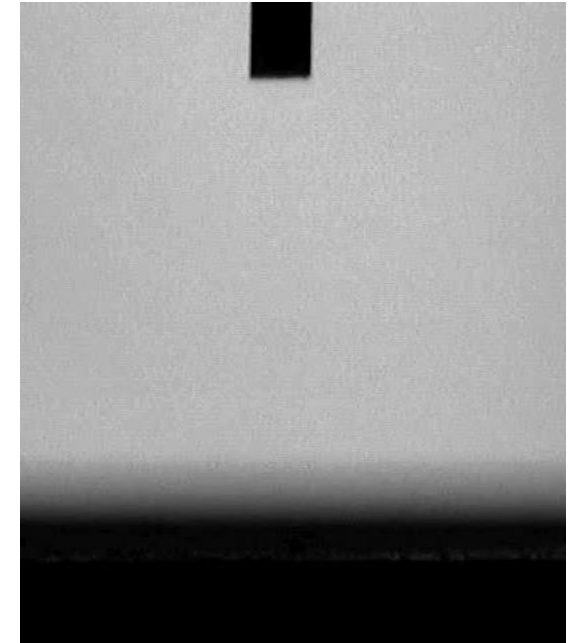
Coatings repel water from steel

- Nanofilaments repel water
- Stable under well conditions
- 10.000 bbls/day
- 100 bar and 70°C

Roll-off test



Contact angle



Thank you!

DTU Offshore

Danish Offshore Technology Centre

