Wetting of Alkanes on Water

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Reconsidering the rather old question of the wetting properties of linear alkanes of water has led to some surprising experimental discoveries. One of the questions was at which alkane chain length the first-order transition from partial to complete wetting takes place. Measurements of the equilibrium film thickness of pentane on water (for which a long-standing debate was going on) revealed that a continuous rather than first order transition takes place. This transition can be understood in terms of the Hamaker constant of the system that changes sign. A second surprise came from the addition of a surfactant to the oil-water interface for longer alkanes. Although the Hamaker constant opposes complete wetting in this case, a wetting film was found that was stabilized by an entropic repulsion: the fluctuations of the oil-water become large due to the extremely low interfacial tension.

[1] K. Ragil, J. Meunier, D. Brosseta, J.Indekeu, and D. Bonn, *Phys. Rev. Lett*. **77,** 1532 (1996).
[2] H. Kellay, J. Meunier, and B.P. Binks, *Phys. Rev. Lett.* **69,** 1220 (1996).