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Current problems in kinetics of wetting and spreading

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There has been a substantial increase in the number of publications in the field of wetting and spreading since 2010 [1]. This increase in the rate of publications can be attributed to the broader application of wetting phenomena in new areas.
The current state of the art in the field of wetting and spreading will be presented. Selected topics in the field are as follows: (i) Contact angle hysteresis on smooth homogeneous solid surfaces via disjoining/conjoining pressure. It is shown that the hysteresis contact angles can be calculated via disjoining/conjoining pressure. The theory indicates that the equilibrium contact angle is closer to a static receding contact angle than to a static advancing contact angle. (ii) The wetting of deformable substrates, which is caused by surface forces action in the vicinity of the apparent three-phase contact line, leading to a deformation on the substrate. (iii) The kinetics of wetting and spreading of non-Newtonian liquid (blood) over porous substrates. It is showed that in spite of the enormous complexity of blood, the spreading over porous substrate can be described using a relatively simple model: a power low-shear-thinning non-Newtonian liquid. (iv) The kinetics of spreading of surfactant solutions. In this part, new results related to various surfactant solution mixtures (synergy and crystallization) are discussed, which shows some possible direction for the future revealing of superspreading phenomena. (v) The kinetics of spreading of surfactant solutions over porous materials including hair and biofilms.
The importance of the topic will be presented and fundamental problems to be solved identified.

References
[1] O. Arjmandi-Tash, N. M. Kovalchuk, A. Trybala, I. V. Kuchin, V. Starov, Langmuir, 2017, 33, 4367–4385.

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