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# Custom-built wetting properties in microchips with geomaterials by using layer-by-layer (LbL) assembly technology

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Wettability is known to have an enormous impact on oil recovery in the petroleum industry and efforts are being made to assess the role of such conditions. This work creatively tailors the microchip surface wetting property by using rock-forming mineral coatings. The mineral surfaces are created in microchips by using the novel layer-by-layer (LbL) assembly technology.[1] The formed mineral surfaces are equipped with varying roughness and wetting properties when different types of rock-forming minerals. The relationship between surface wettability and roughness is quantitatively studied. The fluid dynamics in the confined geometries with varying surface properties including wettability and roughness is analyzed. As an example of applying the developed microchip devices with custom surfaces to solve practical subsurface questions, the wettability alteration during the chemical enhanced oil recovery (EOR) processes, like surfactants, foam and nanoparticles, are studied. This work aims to study the physics of solid-liquid interaction (wetting property) in subsurface porous media by microfluidics technology and thus facilitate the research of chemical EOR measures in the petroleum industry.

## References

[1] Y. Q. Zhang, A. Sanati-Nezhad and S. H. Hejazi, Lab on a Chip, 2017, DOI: 10.1039/C7LC00675F.

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