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Solvent-free synthesis of microparticles on superamphiphobic surfaces

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Polymer particles constitute a large part of synthetic materials. Multicomponent polymer-based microspheres find applications in drug delivery and analysis, photonics and displays. Depending on the function, different materials, sizes, and structures are required, including microgels, core-shell, patchy, multicompartments, and Janus particles. Most well-known strategies for the synthesis of particles include dispersion, emulsion and miniemulsion polymerization. Microparticles are produced in solution or in a confinement formed of immiscible solvents and emulsifiers. Multicomponent, functional microparticles can also be synthesized by modern techniques, for example, by microfluidic, photo or thermal polymerization, or by evaporation of water from a dispersion. All these methods rely on solvents or processing liquids and often involve the use of surfactants. For environmental reasons and to reduce energy consumption, it is desirable to develop strategies that reduce or completely avoid

any type of solvent or emulsifier. Here we show that polymeric and composite microspheres can be produced without solvents, process liquids, or additives by using superamphiphobic layer.

Speaker Biography

Xu Deng received his Ph.D. in 2013 from the Max Planck Institute for Polymer Research, Germany, on the topic of understanding and designing interfacial materials with super-wettability under the advisement of Dr. Doris Vollmer and Prof. Hans-Jürgen Butt. Between 2013 and 2014, he performed postdoctoral research at the same group. In 2014, he moved to Lawrence Berkeley National Lab as a postdoctoral fellow work with Prof. Robert O Ritchie on the subject of innovative bioinspired materials with high strength and high toughness property. In 2015, he was appointed as a full professor at University of Electronic Science and Technology of China. In 2017, he is pointed as the head of Max Planck Partner Group at UESTC. He is interested understanding of wetting dynamics of structured surfaces, creating new super-water and oil repellent coatings and investigate their wetting kinetics. He is also interested in the colloidal system and bioinspired materials.

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