

GRK 2516 Soft Matter Seminar

Oct. 5, 2023 at 2:30 p.m.
Minkowski Room, 05-119, Staudingerweg 7

Research seminar of the DFG Research Training Group GRK 2516 (<https://grk2516.uni-mainz.de>).

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Race to the Interface: How Did Janus Particles Win?

The race of colloids and nanoparticles near the interface presents interesting transport phenomena and unique opportunities to understand their interactions. Stratification was observed when different species preside over the interfaces in the final dried coating structure. However, previous studies mostly focused on conventional homogeneous colloids. We have synthesized amphiphilic Janus particles and investigated their stratification behaviors. When mixed with homogeneous particles, upon drying Janus particles formed a complete and densely packed monolayer with their hydrophobic sides orienting towards air. This drastically increased the water contact angle of the dried film. Confocal study further revealed that Janus particles vigorously diffused towards interface two orders of magnitude faster than the Brownian motion. To explain these observations, we proposed a mechanism based on consideration of adsorption and surface charges. More importantly, the discovery may lead to new fundamental understanding of nanoparticle interactions near interfaces. The results also suggest a novel approach of fabricating functional surfaces using Janus particle as a coating additive.