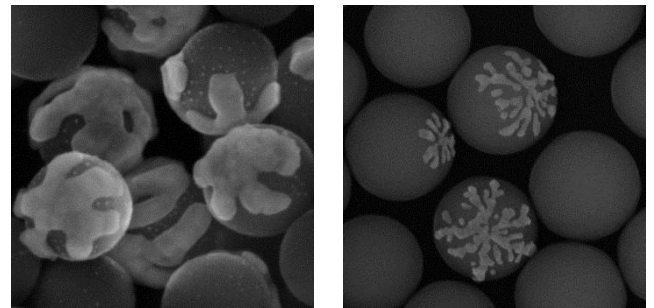


Coating of colloids with different sizes

Bachelor or Master student project

“Patchy” particles are colloids with different surfaces (see figure). They have a huge amount of possible, practical applications. However, a scalable and controllable method to produce such particles has not yet been established. In several experiments, our coworkers made a huge step forward to such a method. However, the interpretation of their results is elusive due to the large number of possible mechanisms influencing the patch growth.



Patchy particles (colloid radius 140 nm (left) and 400 nm (right)). In this case, we have a layer of silver (white) on a silica colloid (grey). The layer thickness and the morphology is highly dependent on the size of the colloid.

Building on our earlier study about the diffusion limited growth of metal patches [1], we want to find out how the size of the colloid influences the growth dynamics and the final morphology of the metal patch (see figure). One possible mechanism responsible for this size dependence is the diffusive flux of the metal precursor from the bulk onto the surface of the colloid. In this project, we will investigate the role of this flux on the growth behavior.

[1] Bao, H. et al. *Nanoscale*, **2014**, 6, 3954-3966

Requirements:

- Statistical physics and partial differential equations (diffusion equation)
- Experience in programming (C++, Python) is welcome but not necessary

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