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Herstellung und Eigenschaften selbstorganisierter Monolagen
Preparation and Properties of Self-Assembled Monolayers

Self-assembled monolayers, SAMs, represent one type of structure that is using molecular self-assembly to build structure and function on the nanometer scale.

A SAM consists of a single layer of organized organic molecules bound to a surface. SAMs offer a unique combination of physical properties that allow fundamental studies of interfacial chemistry, solvent-molecule interactions and self-organization. Their well-ordered arrays and ease of functionalization make them ideal model systems in many fields. SAMs are invaluable substrates in nanotechnology, for example in the fields of material protection, biosensing and device fabrication. One of the most widely studied systems of SAMs are gold-alkylthiolate monolayers[1] (Figure 1). Self-assembly of thiols and dithiols on gold is, in principle, easy to perform and can be done both in the gas phase and in liquid environments (from solutions of different solvents), the latter being by far the most popular method because of its simplicity and accessibility in most laboratories.

Figure **1**. Formation of a SAM on a gold surface via sulfide bridges.

In this lab training, SAMs will be created by depositing (reacting) long chain hydrocarbon molecules on planar gold substrates. Monolayers of alkyl or aromatic thiol molecules containing different end groups will be deposited. We expect that depositing SAMs on the relatively hydrophilic gold surface should change the properties of the surface in respect to its wettability. The main goal of this lab is to verify this simple hypothesis, by contact angle measurements.

[1] C. Vericat, M. E. Vela, G. Benitez, P. Carro and R. C. Salvarezza, Self-assembled monolayers of thiols and dithiols on gold: new challenges for a well-known system, *Chem. Soc. Rev.*, **2010**, *39*, 1805–1834.