Self Assembled Thiols Monolayers on Au(111) Surfaces: Structure Defects and Dynamics

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Alkanethiolate self-assembled monolayers (SAMs) on metals, particularly alkanethiolates on Au, Ag and Cu have attracted considerable scientific and technological attention because they provide a route to control corrosion, wetting and wear properties of metal surfaces, they serve to anchor different functional groups used as chemical and biochemical sensors, they are used as building blocks in nano-devices for electronics, and they are promising candidates as surface active agents in new nano/microfabrication methods. Two-dimensional alkanethiolate SAMs result from the self-assembly of molecules on a metal surface by simple adsorption from the vapor or liquid phases. The control of SAMs quality is a crucial point in many technological applications of SAMs. Here we discuss surface structures, adsorption sites, defects and dynamics of alkanethiolate and sulfur adlayers formed on Au(111) substrates. By using in situ and ex situ STM combined with AES, XPS, and SXRD a detailed picture at the molecular levels of these fascinating two-dimensional structures is presented.

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