

Abstract Submitted
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Reverse self assembly: (111)-oriented gold crystallization at thiol monolayer templates¹ AHMET UYSAL, BENJAMIN STRIPE, PULAK DUTTA, Physics and Astronomy, Northwestern University, BINHUA LIN, MATI MERON, CARS, The University of Chicago — Certain microorganisms can reduce gold ions from aqueous solutions to form gold nano/micro particles in a controlled way [1]. Understanding how biomolecules control the crystallization process may result in cheap and environment-friendly techniques in many different applications, including organic-inorganic hybrid molecular technologies and shape controlled gold nanoparticle production. To better understand the organic-inorganic interactions, we studied the crystallization of gold under octadecanethiol monolayers at the air-water interface. We used synchrotron x-rays in the grazing incidence geometry to determine the orientation of the gold crystals as well as the organic monolayer structure *in situ*. These x-rays also act as the gold reducing agent in this experiment. We see that the (111) faces of gold crystals are parallel to the monolayer surface. The monolayer structure changes with time and becomes commensurate with the gold (111) face, similar to a $\sqrt{3} \times \sqrt{3}$ self-assembled monolayer of thiol on gold.

[1] K. B. Narayanan, and N. Sakthivel, *Advances in Colloid and Interface Science* 156, 1 (2010).

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