

DIRECTION DES SCIENCES DE LA MATIERE,
 DEPARTEMENT DE RECHERCHE SUR L'ETAT CONDENSE,
 LES ATOMES ET LES MOLECULES,
SERVICE DE PHYSIQUE ET DE CHIMIE DES SURFACES ET DES INTERFACES

SEMINAIRE *

Mardi 19 Décembre 2006 à 11h00

Bâtiment 466, salle 111 - CEA Saclay, 91191, Gif sur Yvette

Selective Immobilization of Nanoparticles on Surfaces by Molecular Recognition using Simple Multiple H-bonding Functionalities

I. Arfaoui

Materials Science Centre, University of Groningen, The Netherlands

Invité par F. Charra

Abstract:

Arrays of nanoparticles are expected to show interesting properties, e.g. with respect to their electronic, magnetic or optoelectronic behaviour [1,2]. Here we present results on how bidimensional arrays of Au₅₅-clusters on a surface can be realized [3]. Using a complementary pair of simple alkylthiolates with hydrogen bonding moieties, functionalized Au₅₅ clusters could be selectively deposited onto self-assembled monolayers (SAMs) on gold that carry the opposite functionality (Fig. 1a)). The deposition can be readily controlled by the medium in which the clusters are dissolved and by the density of the functionalities in the SAM, and yields single clusters as well as two-dimensional cluster assemblies on the surface. The clusters are sufficiently strongly bound to give structures that are stable at ambient temperature, and that allow scanning tunneling microscopy (STM) and scanning tunnelling spectroscopy (STS) on single clusters on the surface. Only when the two complementary ligands are present, one on the clusters and the other in the SAM, STM images show specific adsorption of the functionalized Au₅₅-clusters (Fig. 1b)) and no aggregation between Au₅₅ clusters. In the case of the presence of the same ligand on the Au₅₅ clusters and in the SAM or when ligands are present only on the clusters, no specific adsorption is observed.

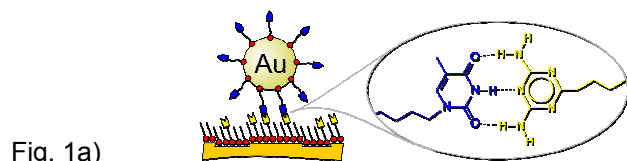


Fig. 1a)

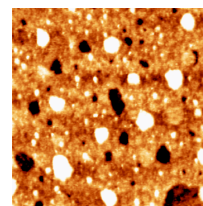


Fig. 1b)

[1] E.A. Speets, B.J. Ravoo, F.J.G. Roesthuis, F. Vroegindewij, D.H.A. Blank, and D.N. Reinhoudt, *Nano Letters* 4, 841 (2004).

[2] C. Burda, X.B. Chen, R. Narayanan, and M.A El-Sayed, *Chemical Reviews* 105, 1025 (2005).

[3] C. van den Brom, I. Arfaoui, T. Cren, B. Hessen, T.T.M. Palstra, J. De Hosson and P. Rudolf, *Advanced Functional Materials* (2006) in press.

*** SERA PRECEDE D'UNE PAUSE-CAFE A PARTIR DE 10H30**