

DIRECTION DES SCIENCES DE LA MATIERE,  
INSTITUT RAYONNEMENT MATIÈRE DE SACLAY

SERVICE DE PHYSIQUE ET DE CHIMIE DES SURFACES ET DES INTERFACES

# SEMINAIRE

Vendredi 30 Mars 2012 à 11h00

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

## Unusual Island Formations of Silver and Iridium on Germanium Studied by LEEM and STM

**Dr. Shirley Chiang**

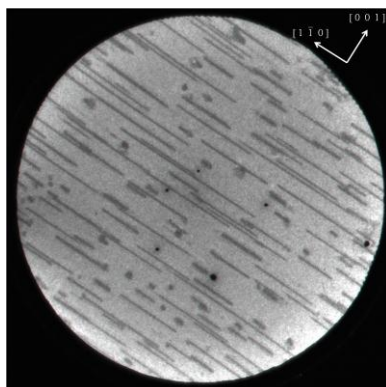
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(invité par Patrick Soukiassian)

The growth of silver deposited on  $Ge(110)$  was studied with low energy electron microscopy (LEEM) and scanning tunneling microscopy (STM). LEEM movies showed the formation of long, one-dimensional islands as Ag was deposited above 700K, with island nucleation proceeding from defects in the  $Ge$  substrate. During deposition, the length of the islands increased while the width remained constant, with island size and distribution dependent on substrate temperature. At 750K, islands were 100 nm wide and 1-20 microns long at 9 ML of coverage. STM images showed that the islands were composed of Ag and that the surface regions between the islands exhibited a reconstruction which is characteristic of pure  $Ge$ .

STM was used to characterize the growth of iridium onto the  $Ge(111)$   $c(2 \times 8)$  surface at different coverages less than 1ML, with samples annealed to temperatures between 550K and 750K. A new form of growth was observed, consisting of pathways connecting larger iridium islands. As the annealing temperature increased, the iridium growth first formed unusual shapes with finger-like protrusions. Next, these shapes broke apart into smaller islands, which ultimately formed into larger islands at higher temperatures. High resolution images were obtained, allowing insight into the atomic arrangements. We have also done simulations of the growth process, which give insight into the origins of this unusual growth behavior.

We also used LEEM to study the growth of, and transformations between the  $(4 \times 4)$ ,  $(\sqrt{3} \times \sqrt{3})R30^\circ$ , and  $(3 \times 1)$  structural phases of Ag deposited on  $Ge(111)$  both below and above the Ag desorption temperature of 850K.



LEEM image of 1D Ag islands grown on  $Ge(110)$  at 410°C. Island widths ~100nm, coverage 7.6ML, 10 $\mu$ m field of view.

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