Preformed Cluster deposition and diffusion as a probe for surface characterization

J. Lion, A. Sarfati and N. Kebaili
Laboratoire Aimé Cotton, Université Paris Sud, 91405 Orsay, France
julie.lion@u-psud.fr

An interesting and original approach in the elaboration process of nanostructured materials consists of using preformed nanoparticles as elementary building blocks instead of atoms or molecules. In this case, the nanostructures obtained have shown that the morphology of islands grown on surfaces from soft-landed preformed clusters depends on the nature and temperature of the substrate, on the nature, size and flux of the clusters.

We have extended those studies to the benchmark deposition of metal clusters on different characteristic surfaces. It appears that, as the mobility of deposited clusters is highly influenced by the surface electronic and topological properties, then nanostructures obtained can also be seen as characteristic signature of local surface structure. Could we use the clusters, not only as building blocks, but also as a local probe for the surface characteristics is the main raised question here.

figure : SEM Images of clusters deposited on MWCNT (left) and HOPG (right) showing defect marking and grain boundaries determination as an example

We studied various surfaces with different type of defects, to differentiate the behavior of the clusters according to the defects and the surfaces. The use of clusters deposition as probe for surface states characterization appears as an attractive and remarkable tool.