o.m8.o3 **Real-time *in situ* study of the morphology of growing metal/oxide interfaces by small-angle grazing incidence synchrotron x-ray scattering.** G. Renaud*, A. Barbier*, M. Noblet*, Y. Borenstzein, R. Lazzari^, J. Jupille^ ,C.R. Henry~., **CEA-Grenoble, DRFMC/ SP2M/IRS, 17 rue des Martyrs, 38054 Grenoble Cédex 9, France. +Lab. d'Optique des Solides, Université Paris 6, Boite 80, 75252 Paris Cedex 05, France, ^ CNRS/Saint Gobain, BP 135- 93303 Aubervilliers Cedex, France, ~CRMC2, Campus de Luminy, Case 913, 13288 Marseille Cedex 09, France.*
Keywords: surface crystallography.

Determining the morphology of islands during their growth on a substrate is a very important task to control the fabrication of nano-objects. The Grazing Incidence Small Angle X-ray scattering technique (GISAXS) has recently been developed to investigate *ex situ* the morphology of aggregates deposited on a substrate. We have developped the GISAXS technique *in situ*, in real time, in UHV, during island growth on a substrate, and starting from the very beginning of the growth.

A fully dedicated experimental set-up has been built on the ESRF ID32 undulator beamline in order to perform GISAXS *in situ*, in UHV, during molecular beam deposition, without any window before the sample, thus avoiding any unwanted background scattering. A 2D CCD detector was used to record the GISAXS patterns.

Very good data were recorded, especially on the asymptotic behavior, during the 3D growth of Pt, Pd and Ag on MgO(001) surfaces at different temperatures.

The lateral extension of the scattering yields the average lateral dimension of the islands; the perpendicular extension, and in particular the location of the second-order scattering peak yields the average height; while the location of the interference peaks parallel to the surface yields the average separation between the islands.

As growth proceeds, all the scattering become more an more concentrated toward the origin of the reciprocal space, indicating a continuous increase of all dimensions in real space, which corresponds to nucleation, growth and coalescence at the same time, and finally percolation of the islands.

Cuts of the scattered intensity both perpendicular and parallel to the surface can be fitted very precisely, including the exact island shape (for instance truncated pyramid) a distribution of islands heights, a distribution of in-plane widths as well as an island-island pair correlation function. Given these fits, the whole 2D pictures are reproduced and compared to the experimental data. They were completed *in situ* by the simultaneous measurement of the differential reflectivity in the UV range, thus probing the plasmon resonances of the clusters, which also allows a determination of their morphology, and *ex situ* by TEM. A wide range of different morphologies was covered.

o.m8.o4 **Surface magnetisation of single crystal $FeNi_3$.** V.N. Petrov[1], M.S. Galaktionov[1], K.N. Komlev[1], F. Schedin[2], G. Thornton[2], *[1]Division of Experimental Physics, St. Petersburg Technical University, 195251, Russia, [2]Surface Science Research Center and Department of Chemistry, University of Manchester, Manchester M13 9PL, UK.*
Keywords: magnetism, surface, spin.

A study of magnetisation of $FeNi_3$(110) surface by Spin Polarised Secondary Electron Emission (SPSEE) method within a wide temperature range has been performed. Magneto-Optic Kerr Effect (? ? ? ?), which implies rotation of the plane of polarisation of linearly polarised light in reflection from a magnetic target, was used for the analysis of bulk magnetic properties of $FeNi_3$ crystal under the same conditions as those involved in SPSEE experiments.

Antiferromagnetic interaction between the surface and the bulk in weak magnetic fields and within the temperature range of ≈650÷760 K has been found out. It has been established than an increase of the magnetic field leads to phase antiferromagnetic-ferromagnetic (AFM-FM) transition of $FeNi_3$ (110) surface with respect to the bulk.

A model of behaviour of magnetisation of $FeNi_3$ surface, based on ferrimagnetic properties of surface sublattices of Fe and Ni has been proposed.