

CeMOX : Collaboration facility for Development of High Performance Multilayer Optics



Blandine.capitania@synchrotron-soleil.fr

Blandine Capitania^a, David Dennetiere^a, Evgueni Meltchakov^b, Catherine Burcklen^b, Sébastien de Rossi^b, Maël Delhinger^a, Julien Lentant^d, Danielle Doweck^c, François Polack^a, Franck Delmotte^b

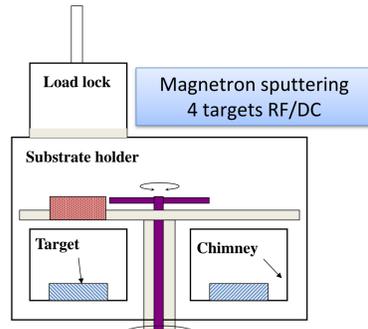
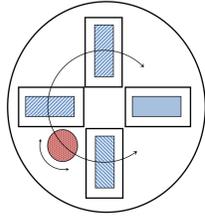
^aSynchrotron Soleil, Gif-sur-Yvette, France.

^bLaboratoire Charles Fabry, Palaiseau, France.

^cInstitut des Sciences Moléculaires d'Orsay, Fédération Lumière Matière, Orsay, France

^dCommissariat à l'Energie Atomique et aux Energies Alternatives, Saclay, France

Plassys MP800

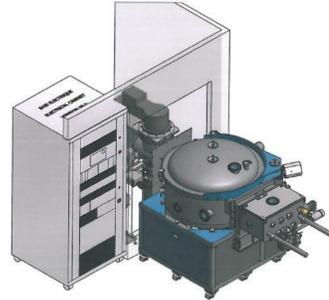


Background pressure : 2×10^{-6} Pa
Working Pressure : 0.1 to 1 Pa
Gas : Ar, N₂, O₂
Targets : 80x200 mm²
2 RF and 2 DC generators
Coating uniformity : 0.5% on ϕ 190 mm
Materials : Mo, W, Sc, Cr, C, Si, B₄C, SiC, Mo₂C, Al, Co, SiO_x, SiN_x



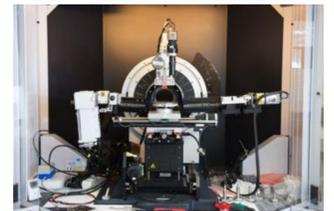
Plassys MP1000

New Magnetron Sputtering machine equipped with
- 4 targets RF/DC
- ion gun
- optics up to 350x100x100mm³



Bruker D8

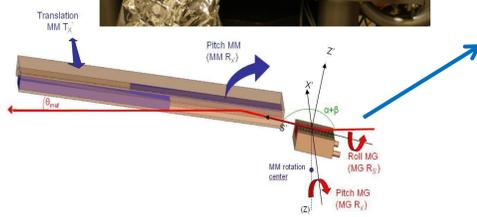
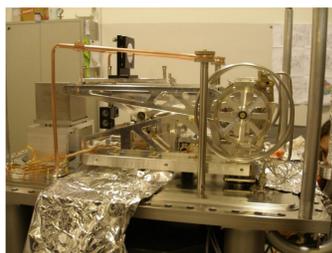
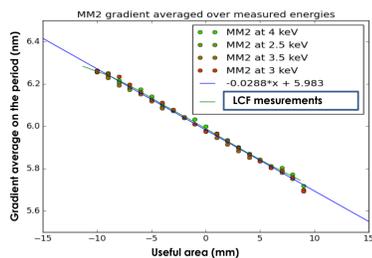
XRR : X-ray reflectometry at 0.154 nm



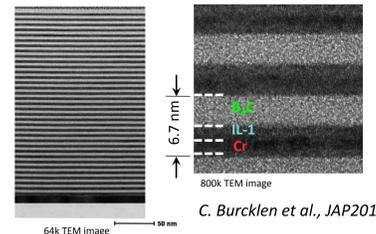
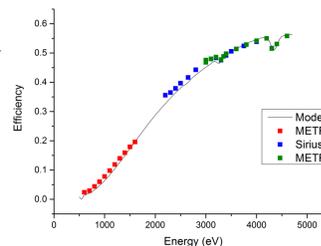
Other available metrologies

- Transmission Electron Microscopy
- Atomic Force Microscopy (SOLEIL)
- EUV reflectometry on SR sources
SOLEIL Metrology beamline (France)

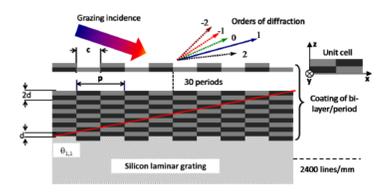
High efficiency gratings for X-ray monochromator in the 1-4keV range



Alternate multilayer grating Efficiency vs Energie



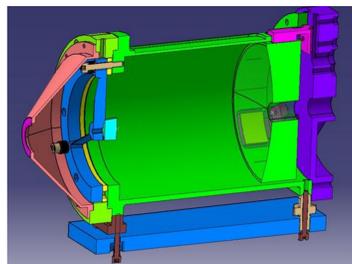
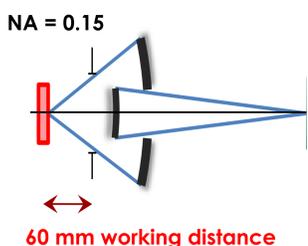
C. Burcklen et al., JAP2016



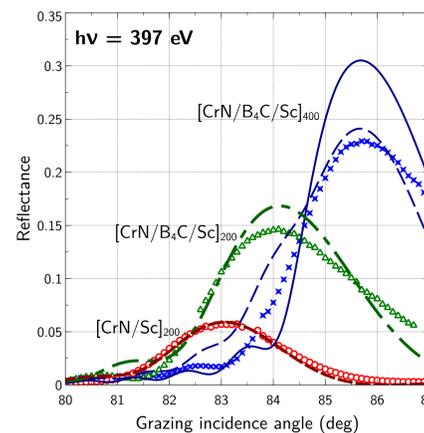
F. Chouekani et al., OL2014

Normal incidence multilayer coating for soft X-ray microscopy in the water window

Schwarzschild x20



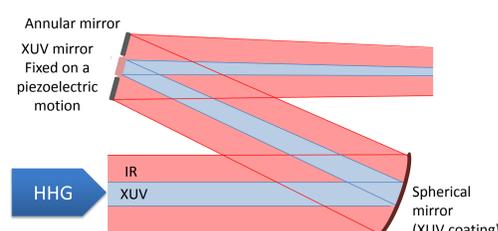
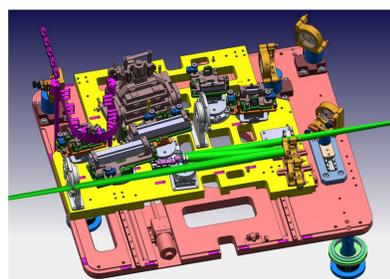
XUV microscope at $\lambda \sim 3$ nm for biological imaging (Equipex Morphoscope)



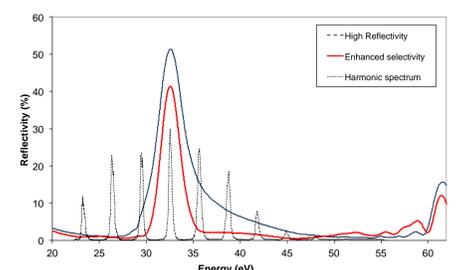
Reflectance vs grazing angle at $E=397$ eV for CrN/Sc and CrN/B4C/Sc samples. SR measurements (symbols), fits with period shift (dashed lines) and fit without period shift (solid blue line).

Mirrors for ultra-fast X-UV sources

Precise selection of bandpass and minimum pulse length (Paris Saclay Lidex OPT2X and Equipex ATTOLAB)



Design of an XUV/IR delay line for High Harmonic Generation (HHG) source



Simulated Reflectivity vs Energy of the XUV mirror