HIGH PRESISION DEPOSITION AND MULTILAYER X-RAY OPTICS

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Multilayer X-ray optics are widely used in X-ray analysis both on laboratory X-ray sources and on synchrotrons. Complementary high precision deposition technologies (MSD, LA-PLD and DIBD) with a reproducibility and long term stability in the picometer range were installed and allow

optimum deposition conditions for a wide variety of material combinations in multilayer fabrication. It is possible to decrease the energy bandpass down to 0.25% and the period thickness down to 1.5nm to replace analyzer crystals like TlAP by multilayer monochromators in RFA applications.

In X-ray diffraction actual developments tend to the design of customized systems using one or two dimensional beam shaping multilayer X-ray optics or the combination of multilayer optics with other types of X-ray optics for a larger variety of X-ray wavelengths than simply the conventional Kα emission lines. A close interrelation of design, deposition, characterization and application is required to produce these tailored systems.

Recently 2 dimensional detectors have reduced the measuring time in comparison to conventional point detectors as applied for the characterization of small organic crystalline samples. These techniques require 2-dimensional X-ray optics in Kirkpatrick- Baez (K-B) or side-by-side (Montel) arrangements. ASTIX optics based on a modified Montel geometry are able to generate high intense focused or collimated beams with improved lateral homogeneity and temporal stability.