

MULTILAYER OPTICS FOR X-RAY ANALYTICS

A. Kleine, B. Hasse, C. Michaelsen, J. Wiesmann, A. Hembd, U. Heidorn, S. Kroth, F. Hertlein

Incoatec GmbH, Max-Planck-Strasse 2, 21502 Geesthacht, Germany

In this poster, we give an overview on current developments of multilayer optics for diffractometry in the lab. We explain the manufacturing process of the optics, summarize the different types of optics and give some examples of typical applications which benefit from the new possibilities, especially in combination with modern microfocus X-ray sources.

The optics consist of bent substrates with shape tolerances below 100nm. By using sputtering technology we deposit multilayers upon these substrates with several hundreds of layer pairs and single layer thicknesses in the nanometer range. To ensure high-quality X-ray optics we fabricate the multilayers with lateral thickness gradients within $\pm 1\%$ deviation of the ideal shape. We use optical profilometry in order to characterize the shape and X-ray reflectometry for the characterization of the multilayer thickness distribution both laterally and as in-depth. The microstructure is investigated by transmission electron microscopy. The beam parameters like monochromaticity, flux, brilliance and divergence demonstrate the quality of the multilayer optics used for different applications in the home-lab as well as at synchrotrons.

For home-lab sources the so-called Montel Optics focus or collimate the beam in 2D with a very high flux density as well as an adequate divergence directly at the sample position. We will be giving results from applications like texture, microdiffraction and stress analysis.

INFORMATION PAGE for the abstract
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You have the permission to post the abstract on the DXC web page and on affiliated sites.

Presenter:

Name: Dr. Andreas Kleine
Address: Incoatec GmbH
Max-Planck-Strasse 2
21502 Geesthacht
Germany
Phone: +49 (0) 4152 889 353
FAX: +49 (0) 4152 889 383
e-mail: kleine@incoatec.de

I would like to present a poster in the session “New Developments in XRD & XRF Instrumentation” by Tim Fawcett.

Publication in the DXC proceedings is planned.