Improvement of Laboratory SAXS Setups by Incoatec’s Scatterless SCATEX Pinholes

A. Beerlink, A. Kleine, C. Umland, J. Graf, C. Michaelsen, J. Wiesmann, C. Gollwitzer, C. Krywka, and J. Kreith

1Incoatec GmbH, Max-Planck-Strasse 2, 21502 Geesthacht, Germany. *sales@incoatec.de
2Physikalisch Technische Bundesanstalt, Institut Berlin, Abbestr. 2-12, 10587 Berlin, Germany.
3Helmholtz-Zentrum Geesthacht, Max-Planck-Straße 1, 21502 Geesthacht, Germany.
4Materials Center Leoben, Forschung GmbH, Roseggerstraße 12, 8700 Leoben, Austria.

Parasitic scattering caused by apertures is a well-known problem in X-ray analytics, which forces users and manufacturers to adapt their experimental setup to this unwanted phenomenon. Increased measurement times due to lower photon fluxes, a lower resolution caused by an enlarged beam stop, a larger beam defining pinhole-to-sample distance due to the integration of an antiscatter guard, and generally a lower signal-to-noise ratio lead to a loss in data quality.

In this presentation we will explain how Incoatec’s lately developed scatterless SCATEX pinholes overcome the aforementioned problems. SCATEX pinholes are either made of Germanium or Tantalum and momentarily have a minimum diameter of 30µm. Thus, these novel and unique apertures are applicable to a wide range of different applications and X-ray energies.

We will show measurements which were performed either at home-lab small angle X-ray scattering (SAXS) systems such as the Bruker AXS NANOSTAR or at synchrotron beamlines. At the PTB four-crystal monochromator beamline at BESSY II data were collected for a comparison of conventional pinholes, slit systems and SCATEX pinholes. At the nano-focus endstation of the P03 beamline at PETRA III, DESY we compared the performance of our SCATEX apertures with conventional Tungsten slit systems under high flux density conditions.