Von Hamos Spectrometer

The von Hamos Bragg crystal x-ray spectrometer was designed for the study of x-ray emission from low-Z elements and L and M x-ray spectra of medium to high-Z targets induced by photon and particle impact. A detailed description of the x-ray spectrometer can be found in Refs. [1,2].

Setup Von Hamos Spectrometer

The principal elements of the instrument are the effective x-ray source defined by a rectangular slit, a cylindrically bent crystal and a position sensitive detector located on the crystal axis of curvature. The crystal is bent cylindrically around a horizontal axis parallel to the direction of dispersion and provides focusing in the vertical direction. The front surface of the detector, the slit axis and the axis of curvature are all contained in the same vertical plane. For a fixed position of the components, an incident x-ray location on the detector corresponds geometrically to a particular Bragg angle and hence to a particular x-ray energy.

The von Hamos geometrypermits at one positioning of the spectrometer components data collection over an energy bandwidth (30-300 eV) limited primarily by the detector length. To study a greater energy interval the central Bragg angle is adjusted by translation of the crystal and correspondingly of the detector along their axes. The angular specifications of this spectrometer allow observing x-rays in an energy range from 0.547 keV to 16.8 keV with six different crystals. The target, crystal and detector are all contained in a stainless steel vacuum chamber (180 x 62 x 24.5 cm^3). The spectrometer chamber is pumped down to about 10^{-6} mbar by means of turbo-molecular pump.