Oral presentation

Recent Developments at Chemical Crystallography Beamline at PETRA III DESY, P24

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Chemical crystallography beamline P24 offers a wide range of crystallographic applications such as charge density analysis, disordered and modulated structures, x-ray standing wave and phase transitions studies under ambient and non-ambient conditions. The beamline consists of two experimental hutches housing a heavy load Kappa diffractometer (EH_1) and Eulerian diffractometer (EH_2). Both hutches offer a range of detectors (pixel area detector e.g. Pilatus 1M CdTe, point detectors e.g. Silicon drift detector, APD) and various sample environments (low and high temperatures, high pressure). Two helium/nitrogen gas jet cryostats are available for phase transition studies in the temperature ranges of 10K-300 K and 15K-500 K; and the nitrogen gas blower and Anton Paar oven up to 1200 K. A common control hutch includes a sample preparation laboratory with fume-hood and supply of standard gases using Schlenk line (e.g. N_2, Ar). A new state-of-art area detector, CdTe LAMBDA 7.5M has been successfully implemented at the beamline. It has a smaller pixel size of 55µm, which provides better resolution and it can handle frame rates up to 2kHz with no deadtime for read out. Smaller pixel size and dead time correction leads to enhanced data quality. High spatial resolution of this detector makes it easier to resolve the satellite peaks in modulated structures. Recently a new sample environment has been developed at P24 for electric field dependent diffraction measurements, where one can simultaneously measure the ferroelectric polarization and diffraction from the single crystal. This helps to study the dynamics of phase transition in ferroelectric materials. In this way one to one correlation between crystallography and ferroelectricity can be established. Future plans at beamline include installation of robotic sample changer and closed cycle cryostat.

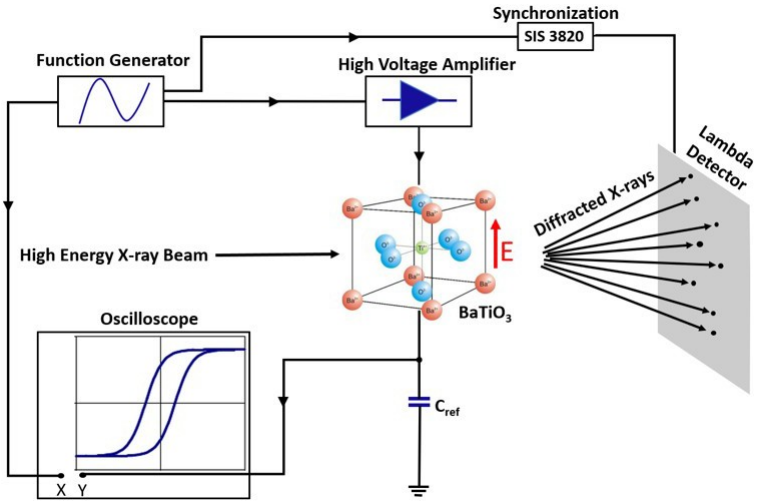

Figure 1. Schematic of in-situ diffraction setup at beamline P24.