Contribution ID: **823** Type: **Invited talk**

Development of in-operando capabilities in TPS 19A High-resolution Powder Diffraction beamline

Wednesday 28 August 2024 16:15 (20 minutes)

The TPS 19A beamline signifies a substantial leap forward in powder X-ray diffraction (PXRD), providing outstanding capabilities for both static structure determination and studies in structural kinetics across a broad spectrum of crystalline samples, including micro and nano materials, even under non-ambient conditions. Outfitted with state-of-the-art instrumentation such as the cryogenic in-vacuum undulator (CU15) for generating highly collimated X-ray beams, the Double Crystal Monochromator (DCM) for precise energy selection, and a micro-focusing system employing Kirkpatrick-Baez mirrors, the beamline ensures efficient data collection and user interaction through a hybrid EPICS, Bluesky, and Python system. Detectors like the Multi-crystal analyzer, MYTHEN 18K, and XRD 1611 enable high resolution and rapid data acquisition, supporting specialized experiments. Moreover, the beamline's versatility extends to accommodating various sample environments, including high/low temperatures, gas adsorption/desorption, electrochemistry, and high-pressure setups with diamond anvil cells. With a focus on in-situ experiments, researchers can investigate structural dynamics in real-time, thereby enhancing our understanding of material behavior. Furthermore, the integration of X-ray diffraction (XRD) and pair distribution function (PDF) analysis techniques provides a comprehensive approach to characterizing material structures, facilitated by advancements in experimental techniques. Leveraging 30keV high-energy X-rays and the large-angle one-dimensional detector MYTHEN 18K enables simultaneous acquisition of high Q and delta Q resolution data, significantly enhancing the analysis of both crystalline and amorphous materials. Overall, the TPS 19A beamline serves as a beacon of innovation in PXRD research, propelling advancements in materials science and fostering scientific exploration through its advanced capabilities and dedication to comprehensive structural characterization.

I plan to submit also conference proceedings

No

Primary author: CHUANG, Yu-Chun (National Synchrotron Radiation Research Center)

Co-authors: Mr CHEN, Bo-Hao (National Synchrotron Radiation Research Center); Mr CHANG, Chung-Kai (National Synchrotron Radiation Research Center); Mr CHEN, Hsin-Wei (National Synchrotron Radiation Research Center); Dr LUO, Xu-Feng (National Synchrotron Radiation Research Center); Dr LAI, Yen-Chung (National Synchrotron Radiation Research Center)

Presenter: CHUANG, Yu-Chun (National Synchrotron Radiation Research Center)

Session Classification: Mikrosymposium 5/1: Operando Investigations

Track Classification: 5. Diffraction and scattering for operando investigations