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High Resolution Powder X-ray Diffraction beamline at Taiwan Photon Source: Structural Characterization and Dynamics

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The low emittance (1.6 nm · rad) synchrotron radiation ring, Taiwan Photon Source (TPS), has reached the design value of 3 GeV and delivered its first synchrotron light on the last day of 2014. In phase I, TPS comprises seven frontier beamlines, which will be constructed and completed commission before the end of 2015. At the excited moments, a dedicated high resolution powder X-ray diffraction beamline is pro-posed to satisfy extensive PXRD user demand. Structure and kinetics of materials are always the attrac-tive and fundamental issues for scientists. To satisfy versatile researches in chemistry, physics and mate-rials, a highly collimated and intense X-ray source will be produced by an in-vacuum undulator (IU22) to obtain the highest possible brilliance in the range of 5-30 keV. A large concentric 3-circle diffractometer equipped with a multi-crystal analyzer system and a fast position sensitive detector (MYTHEN 24K) were designed for high angular resolution and time-resolved studies respectively. The polycrystalline materials under different non-ambient conditions, such as high/low temperature, high pressure and gas de/adsorption, will be provided to investigate structural transformation. In addition, to enhance the beam-line efficiency, a high throughput robot will be installed to allow automated sample mounting. The in situ and time-resolved experiments as well as structure determination from powder diffraction data will be emphasized in this beamline.

Keywords

Powder diffraction

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