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Synchrotron X-Ray Powder Diffraction

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Synchrotron X-ray powder diffraction (SXPD) is a powerful technique for advanced materials research, in particular to study structural changes under non-ambient or in operando conditions. It is therefore not surprising that most synchrotron radiation (SR) sources built SXPD instruments (beamlines) as user facilities. To be presented is the basic methodology supported by beamline examples from prominent large-scale SR facilities such as SPring-8 (Japan), ESRF (EU) and Diamond (UK). With design flexibility and spacious configuration, these beamlines are equipped with different X-ray detection systems for the required diffraction geometries and experimental needs. To satisfy the demand from the diverse user community, also equipped are high throughput robotic sample changers, a range of sample environments and online apparatus, e.g. cryostats and furnaces for low and high temperature experiments and battery cyclers, low- and high-pressure gas adsorption cells for in situ studies.

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