

## **IN-PLANE AND CONVENTIONAL POLE FIGURE MEASUREMENTS**

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X-ray pole figure measurement is a widely used technique to analyze preferred crystal orientations of polycrystalline materials. Pole figures are measured by tilting and rotating a sample while monitoring the intensity of a selected diffraction peak.

This technique requires the sample to be fixed firmly on a sample stage because the sample is tilted about 90 degrees during the measurements. However, this causes problems, if the sample bends easily, or preferred orientation changes under high temperature conditions are in interest and types of glue or fixing jigs that can be used to hold the sample are limited. This problem can be avoided by using the in-plane pole figure technique on a horizontal sample mount goniometer with an in-plane scanning axis. The in-plane scanning axis tilts the detector around the sample to collect complete pole figures instead of tilting the sample. Since the sample stays horizontal during the measurements, this technique requires relatively simple sample holding and can be used when the sample easily bends or needs to be heated during the measurements.

To see if the in-plane pole figures can substitute the conventional pole figures as a technique to analyze preferred orientation when sample holding is an issue, those two techniques were compared in this study. A fiber textured Cu thin film on Si substrate was used as an example. A horizontal sample mount diffractometer, SmartLab, was used for data collection and pole figure display and analysis software, 3D Explore, was used for the pole figure analyses.