

Sample data for X-ray visualization of local bending of the lattice planes (XR-V-LBLP)

Overview

We have improved synchrotron X-ray diffraction imaging, a type of X-ray diffraction topography (XRDT), and have proposed a new method to visualize the local bending of lattice planes (XR-V-LBLP). Data can be used to perform calculations for the proposed method. Data contain two or more reflections at different azimuthal angles of the sample, and each azimuthal data contains two-dimensional diffraction images of the substrate obtained by rotating the angle of incidence.

The dataset description

The folder name: "Substrate Type" + "_" + "Sample Name" + "_" + "Size" + "_" + "Azimuth of Incidence".

Example: GaN_n1_4_0

Substrate Type: GaN,

Sample Name: n1,

Size: 4 inches,

Azimuth of Incidence: 0

The incident azimuths are 0: 0°, 120: 120°, m120: -120°. The angle of incidence is taken in the left-hand system (clockwise). Sizes are 4: 4", 2: 2", m: 7.5x15

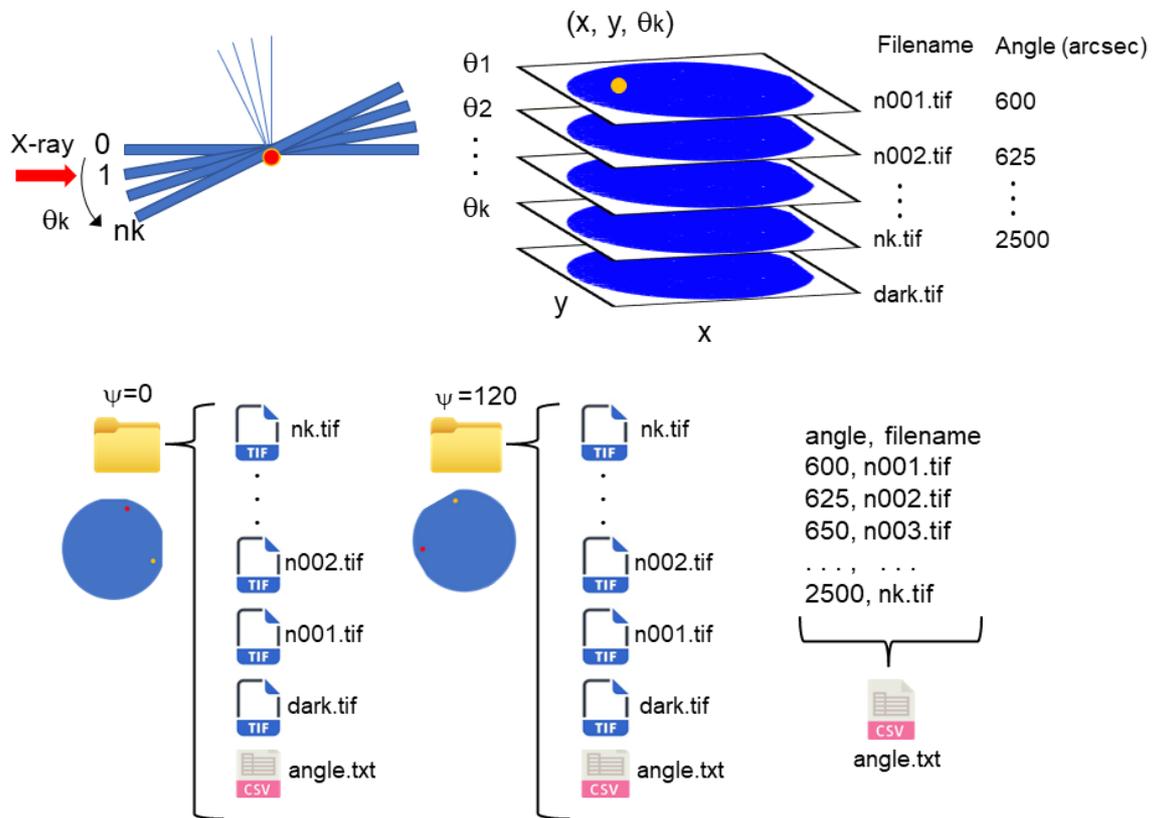


Figure 1 shows a schematic of the data contained in the folders. In each orientation folder, there are two-dimensional image data (TIF format) with different incident angles and data without incident X-rays (dark data). Also included is a file (angle.txt) that associates the angle with the data file name. The unit of the angle is arcsec.

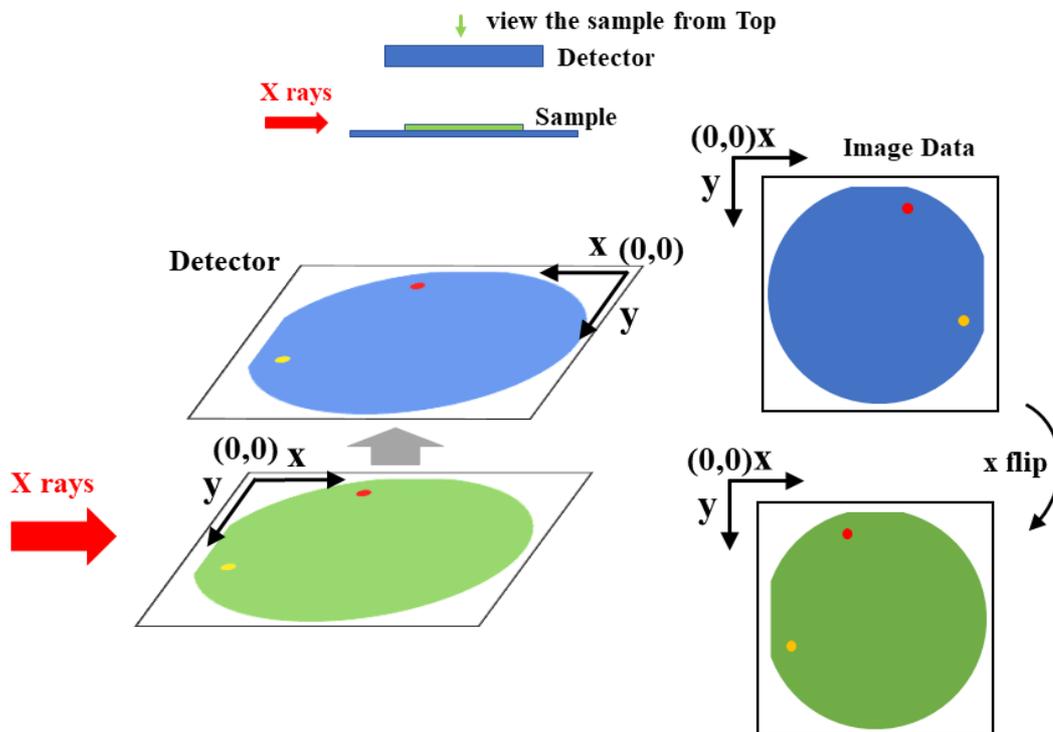


Figure 2 shows a diagram of the sample and the detector in relation to the direction of incident X-rays. Since the origin position of the detector is inverted in the x-axis direction relative to the x-ray incidence direction, the data obtained is also inverted. In actual analysis, the image needs to be inverted.

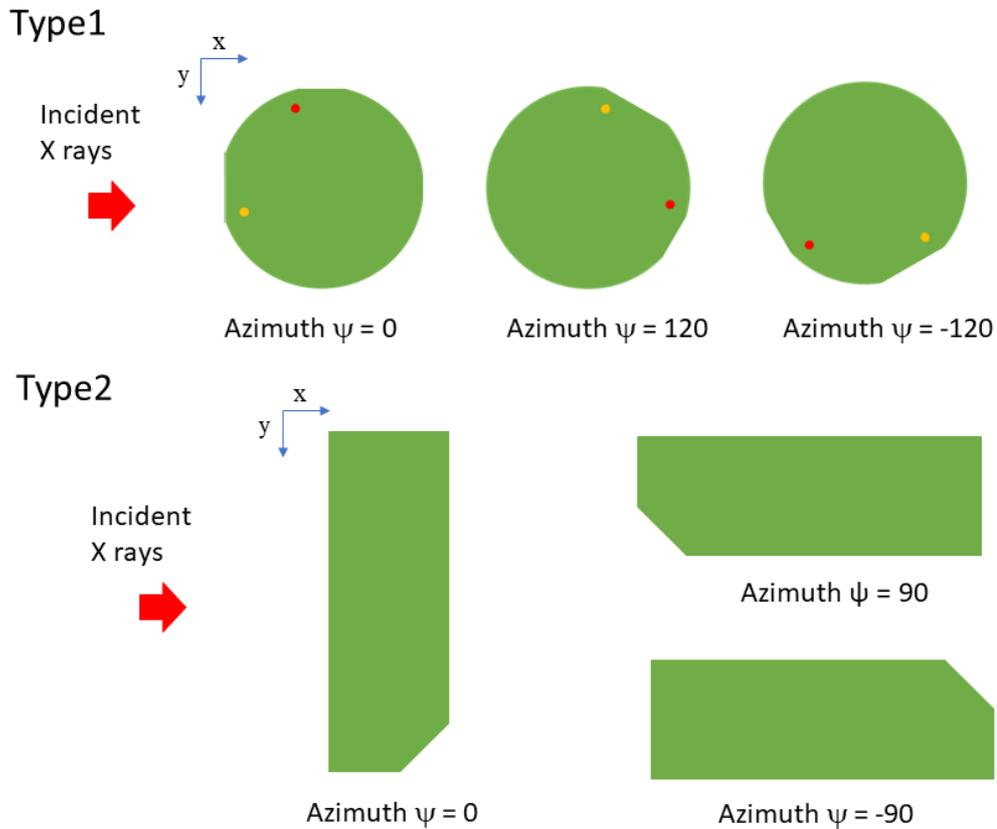


Figure 3 shows a sample installation direction with respect to the X-ray incident direction. Type 1 is a 2 or 4-inch wafer, and type 2 is an m-surface wafer.

List of Dataset and reference

File Name	Azimuth angle	Size	Reference(DOI)
GaN_n1_4_0	0	4	10.1039/C8CE01440J
GaN_n1_4_120	120		
GaN_n1_4_m120	-120		
GaN_n2_2_0	0	2	10.7567/APEX.11.081002
GaN_n2_2_120	120		
GaN_n3_m_0	0	m	10.1039/C9CE00463G
GaN_n3_m_120	120		