

7.2: X-Ray Diffraction Techniques

Two types of targets are used in Bragg diffraction experiments: single crystals and powder targets.

Single Crystal

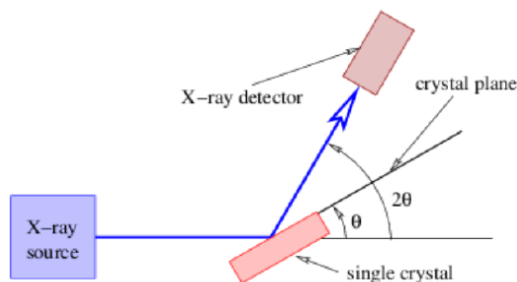


Figure 7.2.2:: Setup for single crystal Bragg diffraction.

In a single crystal setup, an X-ray detector is mounted as shown in Figure 7.2.2. A mechanical device keeps the detector oriented so that the angle of incidence equals the angle of reflection for the desired crystal plane. Peaks in the X-ray detection rate are sought as the angle θ is varied.

The advantage of this type of apparatus is that diffraction peaks from only the selected crystal plane are observed.

Powder Target

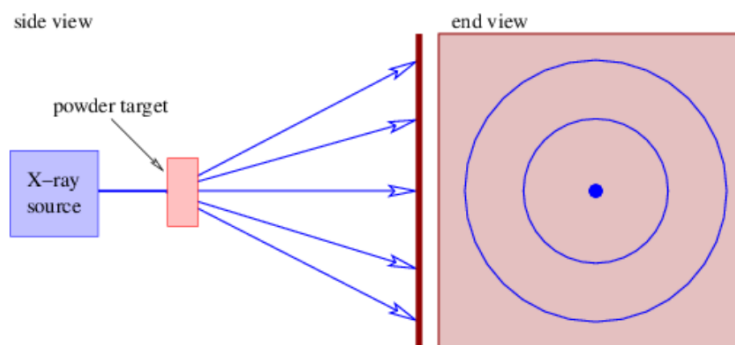


Figure 7.2.3:: Setup for powder target Bragg diffraction.

The powder in a powder target is really a conglomeration of many tiny crystals randomly oriented. Thus, for each possible Bragg diffraction angle there are crystals oriented correctly for Bragg diffraction to take place. The detector is usually a photographic plate or an equivalent electronic device as illustrated in Figure 7.2.3. For each Bragg diffraction angle one sees a ring on the plate concentric with the axis of the incident X-ray beam.

The advantage of this type of system is that no knowledge is needed of the crystal plane orientations. Furthermore, a single large crystal is not required. However, all possible Bragg scattering angles are seen at once, which can lead to confusion in the interpretation of the results.

This page titled [7.2: X-Ray Diffraction Techniques](#) is shared under a [CC BY-NC-SA 3.0](#) license and was authored, remixed, and/or curated by [David J. Raymond \(The New Mexico Tech Press\)](#) via [source content](#) that was edited to the style and standards of the LibreTexts platform.