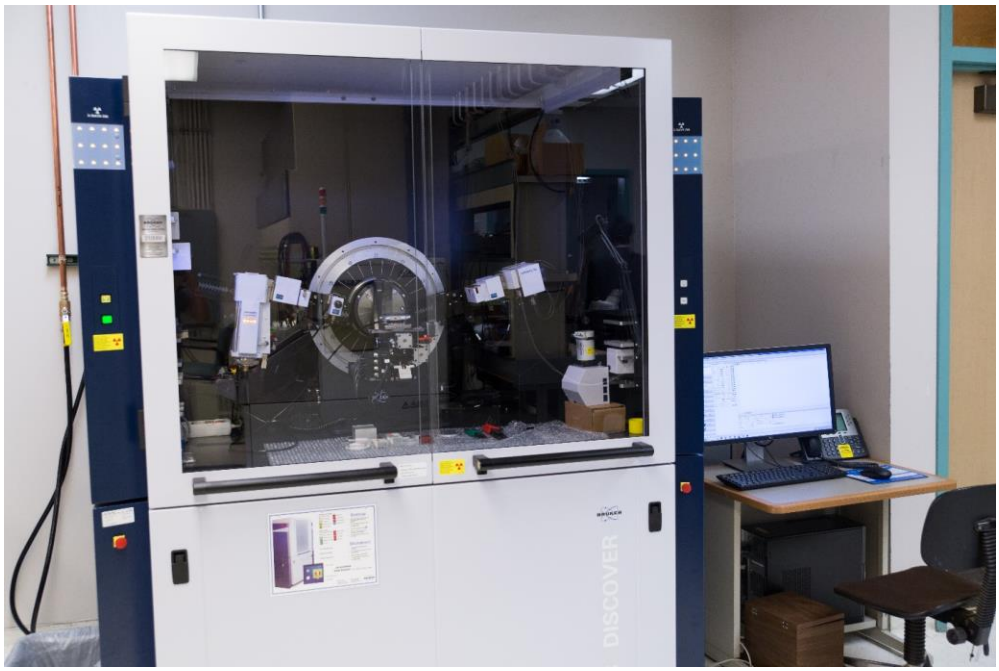
Bruker D8 Discover X-ray Diffraction System



X-ray diffraction (XRD) is a non-destructive technique for analyzing the structure of materials, primarily at the atomic or molecular level. It works best for materials that are crystalline or partially crystalline (i.e., that have periodic structural order) but is also used to study non-crystalline materials.

When electrons have sufficient energy to dislodge inner shell electrons of the target material, characteristic X-ray spectra are produced. By convention, the angle between the incoming and outgoing beam directions is called 2θ. In a sample, consisting of sheets of charge separated by a distance d, constructive interference (greater scattered intensity) is observed when Bragg's Law is satisfied:

$n \lambda = 2 d \sin \theta$

Here n is an integer (1, 2, 3, ...), λ is the wavelength of the x-ray beam, and θ is half the scattering angle 2θ shown above.

System specifications:

- Copper is used as target material for single-crystal diffraction, with CuKα radiation = 1.5418Å
- The "LYNXEYE" detector gives very fast X-ray diffraction measurements Developed on the base of the "compound silicon strip" detector technology.

- The “Highres” detector designed for ultra-high resolution (0.0035 ° instead of 0.008° obtained by LYNXEYE) measurement of single crystals and films.
- Ni foil filters are available for removing Kβ.
- Cu absorbers (0.2/0.2 and 0.05 mm thick) are available to remove high-energy photons due to its k-absorption-edge.
- Cu slits are available for make the beam parallel.

Safety notes:

- **Users must pass the “radiation safety training” before getting access to the XRD instrument.**
- **Do not open the glass door when the X-ray shutter is open.**
- **Chillers needs to be on for at least 20 mins after using the XRD.**