Powder X-Ray Diffraction (Powder XRD)

Introduction to XRD and Powder XRD

- XRD theory
- Bragg diffraction
- Image of XRD machine from connexions
- Schematic diagram of XRD machine

Production and detection of xrays

- X ray tubes, relationship to XPS
- gas proportional counters, scintillation detector, Multi-wire proportional counter, CCD-camera

Operation of the powder xrd machine

- Sample preparation
- Scanning
- Results (Include sample NaCl spectra)

Determining crystal structure (Basic PXRD)

- Determining BCC FCC SC structure in cubic crystals
- Calculating the lattice parameter
- Worked example for NaCl

Determining composition

- JCPDS data

Conclusion

- Pros and cons of powder xrd
- Many chemical species cannot be prepared as a single crystal of size and quality enough for single crystal xrd
- Solid state reaction monitoring
- References to other more complex XRD analyses