Nuclear Diffraction

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Diffraction techniques have proved to be one of the most powerful and valuable methods to study structural details in crystalline compounds. Compared with X-rays the peculiarities of neutrons are most useful for studies on compounds which contain light elements, elements neighboured in the periodic table of elements or magnetic features [1].
Firstly a brief introduction of the principle of elastic scattering on powders and single crystals will be given including and overview of the fundamental similarities and differences between X-ray and neutron radiation and how they affect the selection of the most suited method. This includes also some information about the sample and method specific considerations required to transform the experimentally collected data into a form that useful physical and chemical properties of the crystalline structure can be extracted during the refinement process.
Afterwards various examples of powder and single crystal diffraction from different fields of science will be given to illustrate the different applications but also the specific benefits and limitations of different techniques.

[1] Handbook of Solid State Chemistry, Vol. 3: Characterization; R. Dronskowski, S. Kikkawa and A. Stein (eds.); Whiley (2017)