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Synergic use of diffraction techniques for material structural characterization

The synergic use of different diffraction techniques gives the chance to deal with complex crystallographic problems of otherwise difficult solution. Single crystal and powder diffraction have somewhat complementary characteristics, while the appropriate choice of the radiation (e.g. X-rays, neutrons, electrons) permits to explore different features of the materials structure. For example, the complementary use of synchrotron diffraction data (single crystal and powder) together with neutrons powder diffraction allowed the effective structural solution and refinement for the multiferroic double perovskite Pb_2MnWO_6 , finally unveiling the structure-properties relations in this material. Another interesting case is the study of the Ga_2O_3 epsilon phase, whose accurate crystallographic analysis required the use of both electron diffraction and single crystal X-rays experiments.