シンポジウム B-3

Analysis of Powder Diffraction Collected on the Australian Beamline at the Photon Factory

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A high resolution powder diffractometer, BIGDIFF, utilising Imaging Plates (IP) has been constructed on Beamline 20B at the Photon Factory, "The Australian Beamline". A unique feature of IP is the ability to collect data over a 160° two theta range in as little as 5 minutes. Essentially the instrument is a Debye-Scherrer camera of 0.573 metre radius. The place of the film in a conventional camera of this type is taken by image plates. In order to eliminate scattering and absorption by air the instrument is evacuated. More details of both the design and performance of the diffractometer have been given previously [Cookson et al, Barnea et al]. Of at least equal importance to the speed of data collection is the quality of the data, in terms of peak shapes and half widths, and this is found to be extremely high thus enabling routine Rietveld type analysis of powder diffraction patterns - or does it?

Powder diffraction data for a number of samples have been collected and the results of analysis of this data will be presented. The samples studied range from simple metal oxides, such as rutile, TiO_2 or bixybite Mn_2O_3 through oxygen deficient pyrochlores, $\text{Pb}_2\text{M}_2\text{O}_{7-y}$ to coordination compounds such as $[\text{Co}(\text{NH}_3)_5\text{X}]\text{X}_2$ X = Cl, Br. These, and other, examples will be used to illustrate both the advantages and limitations of BIGDIFF, especially in connection to collection and analysis of the data.

Barnea, Z., Creagh, D., Davis, T.J., Garrett, R.F., Janskey, S., Stevenson A. W., and Wilkins, S.W. Rev. Sci. Instr. 63,(1992) 1069

Cookson et al J. Applied Cryst. Submitted for publication.