



Experiment title: Determination of the electric field induced structural changes in KH_2PO_4 (KDP) at the phase transition point, using x-ray diffraction	Experiment number: CH320/CH321	
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Names and affiliations of applicants (*indicates experimentalists):

G. Heunen*, ESRF
H. Graafsma*, ESRF
A. Puig-Molina*, ESRF
S. Scheres*, ESRF
A. Kvik*, ESRF
A. Ibanez*, CNRS, Lab. for Crystallography, Grenoble

Report:

The changes in integrated intensities for piezoelectric crystals in an external electric field are very small ($\Delta I/I=0.1\%$). Studying these small changes on conventional X-ray sources, is very time consuming. Hence, synchrotron radiation reduces the measuring time by a factor of 100. However, for a full data collection, for several thousand reflections, the measuring time is still too long. In order to decrease the measuring time further (by a factor of 100) the broad energy band-pass method(1) was recently developed. This method allows fast data collection (<1 second per reflection), by measuring the full integrated intensity, only at one ω setting, by means of a broad energy band.

A data collection, due to KDP sample problems, was taken on LiNbO_3 .

The LiNbO_3 sample had the dimensions of $6 \times 5 \times 1 \text{ mm}^3$, with aluminum electrodes evaporated on the $6 \times 5 \text{ mm}^2$ surface. The applied electric field had a strength of $5 \times 10^5 \text{ V/m}$ and was applied in the [001]-direction. The X-ray energy was 50keV with $\Delta E/E=1\%$.

Ten reflections could be measured per hour and 730 reflections were measured in total.

Currently, the data analysis is being under investigation.

(1) H. Graafma, G.W.J.C. Heunen and C. Schulze. J. Appl. Cryst. In Press (1997).