



	Experiment title: Aqua-ion structure in aqueous electrolyte solutions: An Anomalous X-ray Scattering study of Cs ⁺ , Rb ⁺ , Br ⁻ and I ⁻ .	Experiment number: SC-526
Beamline: ID01	Date of experiment: from: 18-JUN-1999 to: 22-JUN-1999	Date of report: 9-August-1999
Shifts: 12	Local contact(s): M.J.CAPITAN and D.LEBOLLOC'H	<i>Received at ESRF:</i>
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Report:

During the last 12 months we have been investigating the feasibility of Anomalous X-ray Diffraction (AXD) in the study of the structure around ions in aqueous electrolyte solutions. Following the success of our first experiment (see report for expt. SC-417), we decided to continue our research programme at ID01. This beamline offers all the necessary features to carry out this study: high flux, good energy resolution for the incident beam and an analyser crystal to select the energy in the diffracted beam.

The aim of the present experiment was to measure the ion-hydration structure of Br⁻ and Rb⁺ in concentrated solutions using the AXD technique. The counter ions in each one of the salts were chosen so that they would not contribute strongly to the scattering process. With this choice we were expecting to minimise the absorption from the sample and test the importance of the counter ions on how reliable the quantitative data obtained were.

The Cs^+ and I^- ions were not studied because the monochromator available at the time would not give enough flux at such energies (~ 30 KeV). This problem will be sorted out with the new monochromator and we will try to study them when it is available.

Diffraction experiments were made at 200 and 5 eV from the Rb (15.2 KeV), Br (13.4 KeV) and Sr (16.1 KeV) K-edges. The samples used were 4 molal RbCl, 4 molal LiBr and 3.5 molal SrCl_2 , all of them dissolved in water.

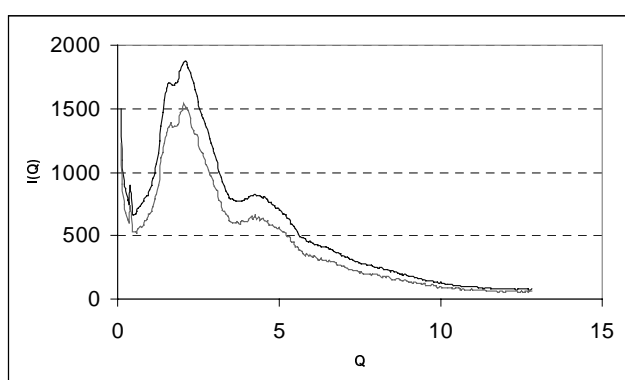


Figure 1: RbCl raw data

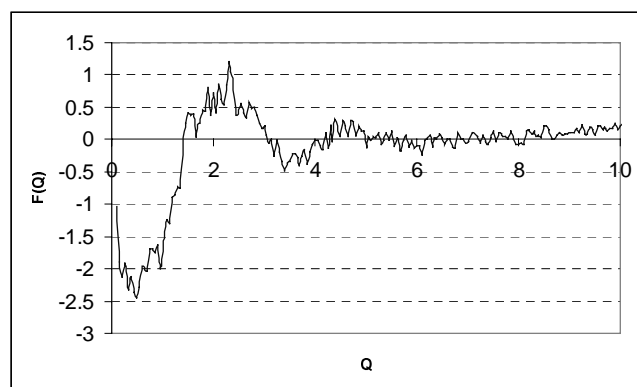


Figure 2: RbCl difference

Figure 1 shows the raw intensities measured for the RbCl solution, where a clear difference can be seen. Figure 2 shows a crudely normalized first order difference between the two patterns, which shows clear common features with the first order difference obtained with NDIS for the K ion by our group [see G.W.Neilson et al., Chem. Phys. Lett., **114** 1 35 (1985)].

At the moment, we are analysing these data in more depth. We will follow the same procedures that were used with success in our first experiment [S. Ramos et al., to be published].