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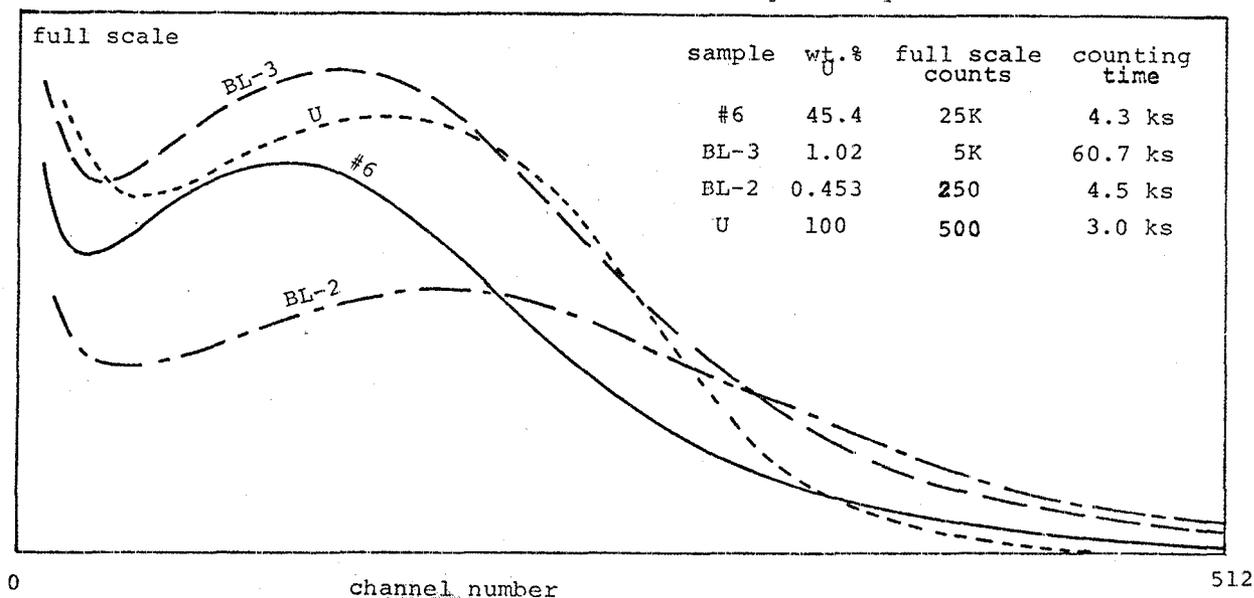
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Figure 3: Pulse-height analysis



CLEANING QUARTZ GRAINS

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A simple method of cleaning quartz grains using HF acid is described in the following note (see also, Langmyhr and Sveen, *Anal. Chem. Acta*, 32, 1, 1965). This technique is quite useful as it allows one to use only a single beaker, thereby reducing the chance of losing crystals. Furthermore, when etching is completed, addition of an AlCl_3 solution pacifies the harsh HF solution and eliminates the problem of precipitated flourides.

Sieved grains (up to a few hundred milligrams) are placed in the bottom of a dry 100 ml Nalgene polypropylene beaker. Approximately 5 ml of 49% HF acid is slowly added. The mixture is carefully swirled and then allowed to sit at room temperature for 30 minutes. At the end of this time, approximately 50 ml of 25% AlCl_3 solution is added. (This solution is easily prepared by placing the contents of a standard one pound jar of $\text{AlCl}_3 \cdot 6\text{H}_2\text{O}$ crystals in a one litre bottle and filling it with distilled water.) After swirling, the beaker is placed in a boiling water bath and the solution is slowly stirred using a Teflon covered stirring bar with a hot-plate stirrer.

After a few minutes the cloudy solution will become clear (sometimes slightly yellow), and the cleaned grains can be retrieved by filtering with a glass frit and vacuum apparatus. When the last of the solution has been drawn off, the crystals are washed twice using distilled water and acetone. After drying, the grains can be loosened and removed from the frit by gently tapping over a piece of weighing paper.

The procedure may be changed for larger or smaller samples by simply scaling the listed quantities.