

## X-ray Analysis of an Unknown Mineral

You have two samples of unknown minerals. For each:

1. Grind up the sample, X-ray it.
2. Use Jade to figure out what the mineral is.

Once you figure out what the mineral is, you can get a, b, c,  $\alpha$ ,  $\beta$ , and  $\gamma$  from Jade (or for some other source).

Now do some spread sheet calculations:

3. See Box 12.2. Using the cell parameters you got from your X-ray, calculate d-values for X-ray peaks. Consider all h, k, and l values that give d-values between about 1 Å and 10 Å. I suggest you find some systematic way to do this, and for sure use a spreadsheet.
4. Now modify your spreadsheet so the d-values are converted to  $2\theta$  values using Bragg's law. Finally, add another column to your table that has  $2\theta$  values. These are the angles at which X-ray peaks can occur, in principle. Of course they will not occur if there are not atoms on the planes to cause diffraction.
5. Return to the actual X-ray scan. Using your calculated  $2\theta$  values, label all the major peaks with correct (hkl).
6. Hand in scan and spread sheet and a brief report giving the equations you used and discussing what you did and why it did or did not work.