

## Geos 306 Class project

### Characterization of an unknown mineral using X-ray diffraction and Raman spectroscopy

1. **Obtain a sample of an unknown crystalline substance.** You may use your own sample if approved. Samples should be homogenous crystalline minerals. Soils, clays, and mixtures should be avoided.
2. **Obtain a powder-diffraction pattern.** Use the XRD Commander to operate the machine at  $2\theta$  from  $5^\circ$  to  $90^\circ$  with help and supervision from your TA or X-ray lab staff.
3. **Identify the material.** Search for a matching pattern using EVA program. Print out the X-ray pattern of your mineral.
4. **Index the peaks and refine the cell parameters.** Use the CrystalSleuth software provided in the Software link at the course website. Print the refinement output file.
5. **Obtain a Raman spectrum.** Identify the mineral using the search command. Perform corrections for unwanted peaks and background. Print the spectrum.
6. Create a figure of the structure of your mineral using XtalDraw. Print a crystal structure drawing of your material.

Hand in a report consisting of:

1. The name of your mineral and its chemical composition
2. A description of your sample including color, habit, luster, and other properties as they pertain to your sample
3. A nice picture of the sample found from the Internet
4. The X-ray diffraction pattern
5. A copy of the refinement output
6. The Raman spectrum
7. Picture of the crystal structure