

**Homework 2**  
**MINERAL STRUCTURES AND CHEMISTRY**

The purpose of this assignment is to re-familiarize yourself with the chemical compositions and structures of the common (or geochemically important) igneous minerals. This information is going to be important when we start thinking about geochemical tools that we use to infer the origin of igneous rocks. It is also important to know about possible solid solution between mineral phases in our discussion of thermodynamics.

**Make a table that includes the following minerals / mineral groups:**

Olivine (forsterite-fayalite)  
Pyroxene group (both ortho- and clino-)  
Quartz  
Feldspar group (plagioclase and alkali feldspars)  
Amphibole (only hornblende and kaersutite)  
Mica (only biotite and muscovite)  
Zircon

**For each of these minerals / mineral groups, determine:**

1. The chemical formula or formulas and names of end-member or important natural compositions in a mineral group (ie,  $M_1M_2T_2O_6$  for pyroxene; Enstatite, Ferrosilite, Augite, Pigeonite, Diopside, Hedenbergite for pyroxenes);
2. A list of cation sites and their coordination with oxygens (for example, X, M1, M2, T1, T2; M's are octahedral sites, T's are tetrahedral sites; X is an irregular 5-coordinated site);
3. The degree of solid solution between the different end-members of each group, if relevant.

You should be thinking about the connection between the size and type of a cation site and the degree of solid solution between end-members of a mineral group.

**Organize this information in a table.**

Please include a **reference list** with your table.

**Some places you may want to look for this information include:**

Mineralogy books (Wenk, Klein and Hurlbut (in class or library))

Mineralogy databases on the web:

<http://www.mindat.org/>

<http://mineral.galleries.com/>

<http://webmineral.com/>