

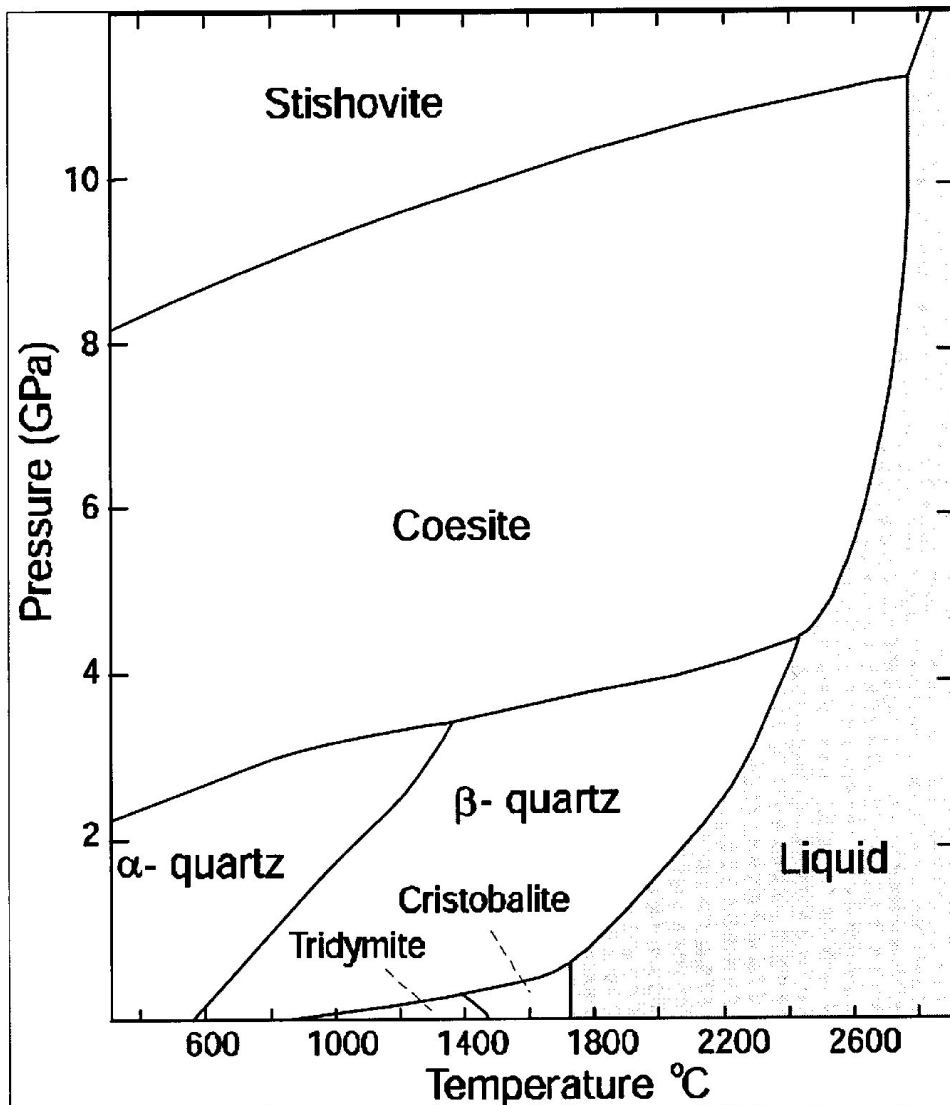
**The Phase Rule:  $F = C - P + 2$**

**P** = the number of phases: the number of different types of mechanically separable portions of the system (don't confuse this with pressure!)

**C** = components: the *minimum* number of chemical constituents that are required to define the composition of every phase in the diagram

**F** = variance or degrees of freedom: the number of intensive parameters that must be specified in order to completely determine the state of a system. Alternatively, F is the number of intensive parameters that can be changed independently without changing the parameters of the phase rule (i.e. losing or gaining a phase).

Consider the following system:



1. Derive **F** at 2 GPa and 600°C (call this point **A**).
2. As the temperature increases at 2 GPa, at what temperature will **P** (# of phases) change? Call this point **B**. Physically, what happens at this temperature?
3. Derive **F** for point **B**.
4. Looking at the diagram, at point A, if you were to increase pressure, would you need to also change the temperature to keep **P** (# of phases) constant? What about at point B? How do these observations relate to the values of **F** at each point?
5. Which polymorph has the lowest Gibbs free energy at **A**? At **B**?