

GEO 306 Min.-Pet. I  
Homework #7; 2 April 2003  
Due: 7 April 2003

Name \_\_\_\_\_

- 1) Using the following diagram for the forsterite-silica binary, describe the sequence of equilibrium crystallization for a melt composition 55.3 wt %  $\text{SiO}_2$ ; 44.7 wt. %  $\text{MgO}$  by answering these questions:
- Show this composition on the diagram by drawing the isopleth (Note: plot as mole fractions)
  - Is this composition silica oversaturated, silica saturated, or silica undersaturated?
  - What phases will be in the final crystalline assemblage and in what proportions? (mole percent)
  - At what temperature do crystals begin to form and what mineral phase are they?
  - In equilibrium at  $1650^\circ\text{C}$ :
    - what phases are present?
    - what are their relative abundances (use mole percent)
    - what are the compositions of each phase (chemical formula or mole % oxide).
  - From the information in part e), calculate the bulk composition as wt% component oxides and compare it to the initial bulk composition to show that mass balance is satisfied (closed system)
  - At what temperature does the last bit of liquid crystallize?
  - What is the composition of this last liquid (mole % oxide) and what is this composition called?

