GLY 4200
Homework Exercise 5

# Binary Phase Diagrams - Solid Solution Behavior

1. On the first diagram, outline the liquidus in green, the solidus in brown.

2. Trace the behavior of the melt at A as it cools from 1800°C to 1400°C. Show the path followed by the liquid in red, and by the solid in blue on the first attached diagram. Express all compositions in terms of weight % forsterite, i.e. $Fo_{xx}$

At what temperature do the first crystals appear?_____°C_____

What is the composition of the first crystals?_____ At what temperature is the liquid entirely converted to the solid?_____°C_____

What is the composition of the final liquid phase?_____

What is the composition of the liquid phase at 1500°C?_____

What is the composition of the solid at 1500°C?_____

3. On the second diagram trace the behavior of composition B as it is heated from 1200°C to 1800°C. Again, show the path followed by the solid in blue and the path followed by the liquid in red.

At what temperature does the first liquid appear?_____°C_____

What is the composition of the liquid at this temperature?_____

What is the composition of the solid at this temperature?_____

At what temperature does the last solid disappear?_____°C_____

What is the composition of the last solid?_____

What is the liquid composition at 1400°C?_____

What is the liquid composition at 1450°C?_____

What is the solid composition at 1450°C?_____

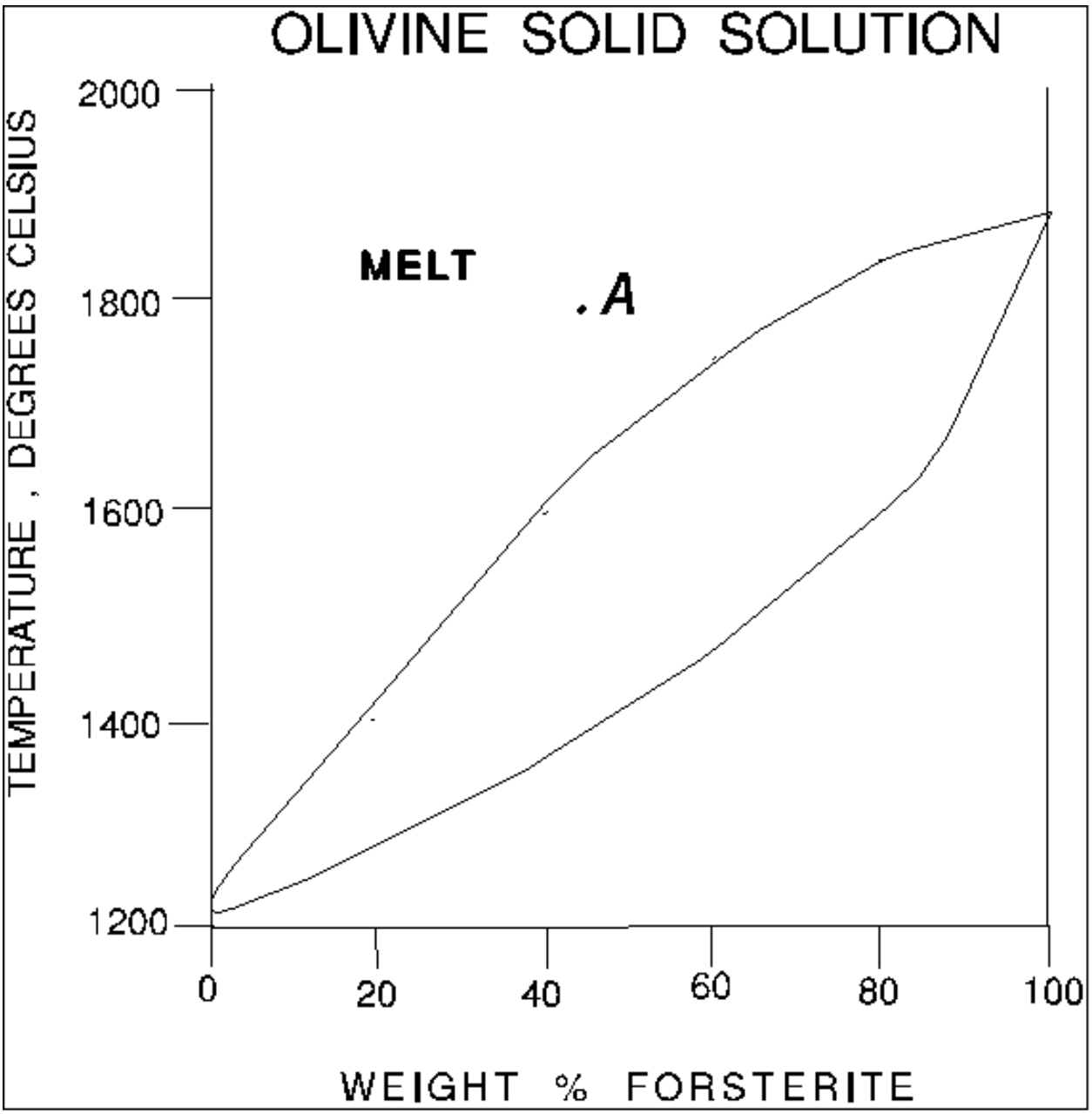
OLIVINE SOLID SOLUTION
TEMPERATURE , DEGREES CELSIUS
2000
1800
1600
1400
1200
MELT
.A
0
20
40
60
80
100
WEIGHT % FORSTERITE

Figure 1

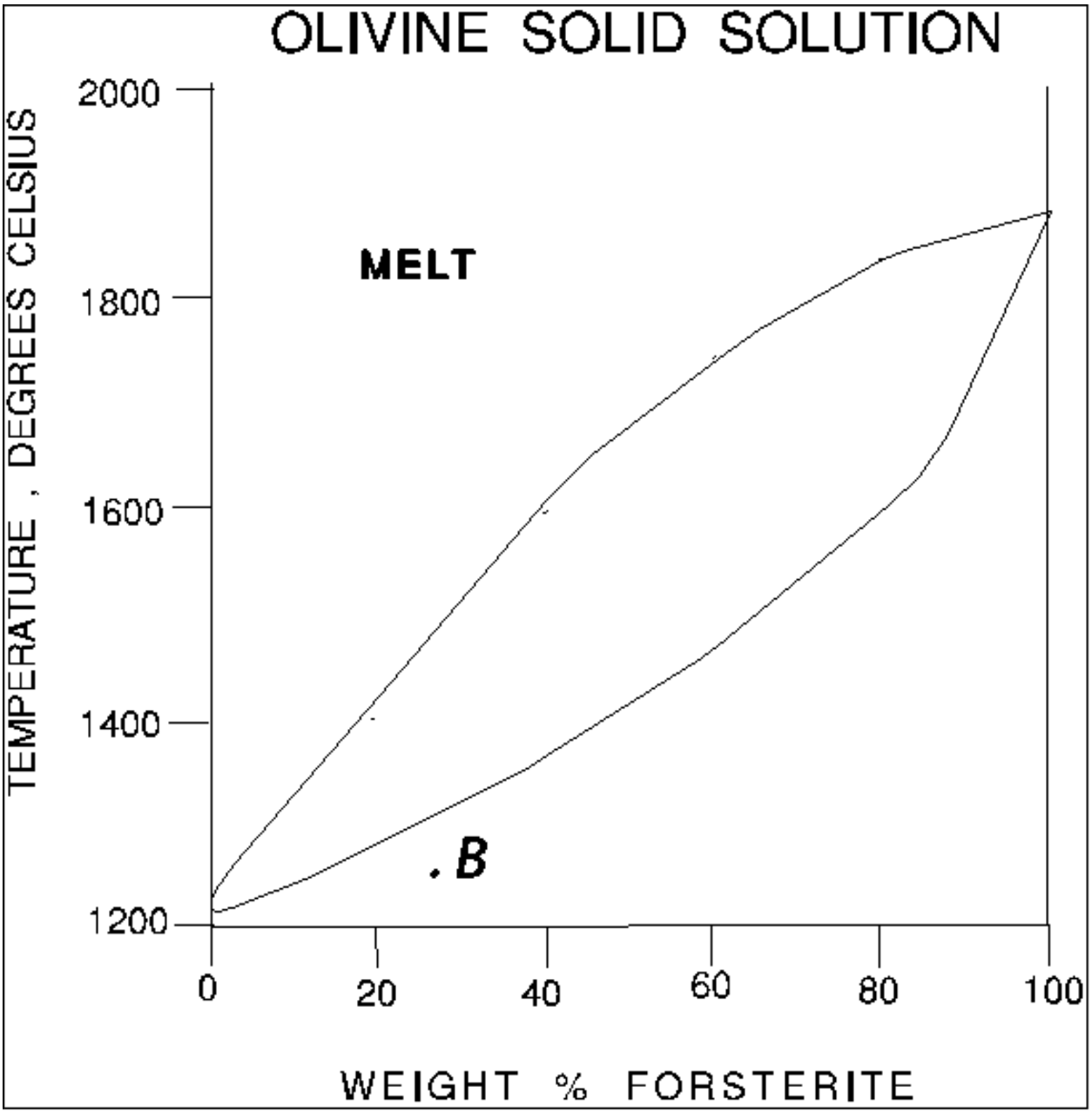
OLIVINE SOLID SOLUTION
TEMPERATURE , DEGREES CELSIUS
2000
1800
1600
1400
1200
MELT
.B
0
20
40
60
80
100
WEIGHT % FORSTERITE

Figure 2