

Binary Phase Diagrams - Eutectic Behavior

1. On the attached diagram (Figure 1) of the anorthite ($\text{CaAl}_2\text{Si}_2\text{O}_8$) - diopside ($\text{CaMg}_2\text{Si}_2\text{O}_6$) system, outline each liquidus line in green, each solidus line in brown.

2. Using Figure 1 starting at 1650°C and 20% An (note scale reads from right to left) trace the cooling behavior of the melt down to 1200°C . Show the path followed by the liquid in red, the path followed by the solid in blue. Then answer the following questions:

a) At what temperature does the first crystal appear? 1360°C

b) What is the composition of the first crystal? 100% Di

c) At what temperature does the first crystal of anorthite appear? 1270°C

d) At what temperature does the liquid disappear? 1270°C

e) What is the composition of the final liquid phase? 40% An, 60% Di

f) What is the composition of the final solid mixture? (Phases present and percent of each)

20% An, 80% Di

3. Using Figure 2 starting at 1200°C and 85% An, trace the behavior of the solids up to 1700°C . Indicate the paths followed by the solid and liquid as in question 2. Then answer the following questions:

a) At what temperature does the first liquid appear? 1270°C

b) What is the composition of the first liquid? 40% An, 60% Di

c) At what temperature does the diopside disappear? 1270°C

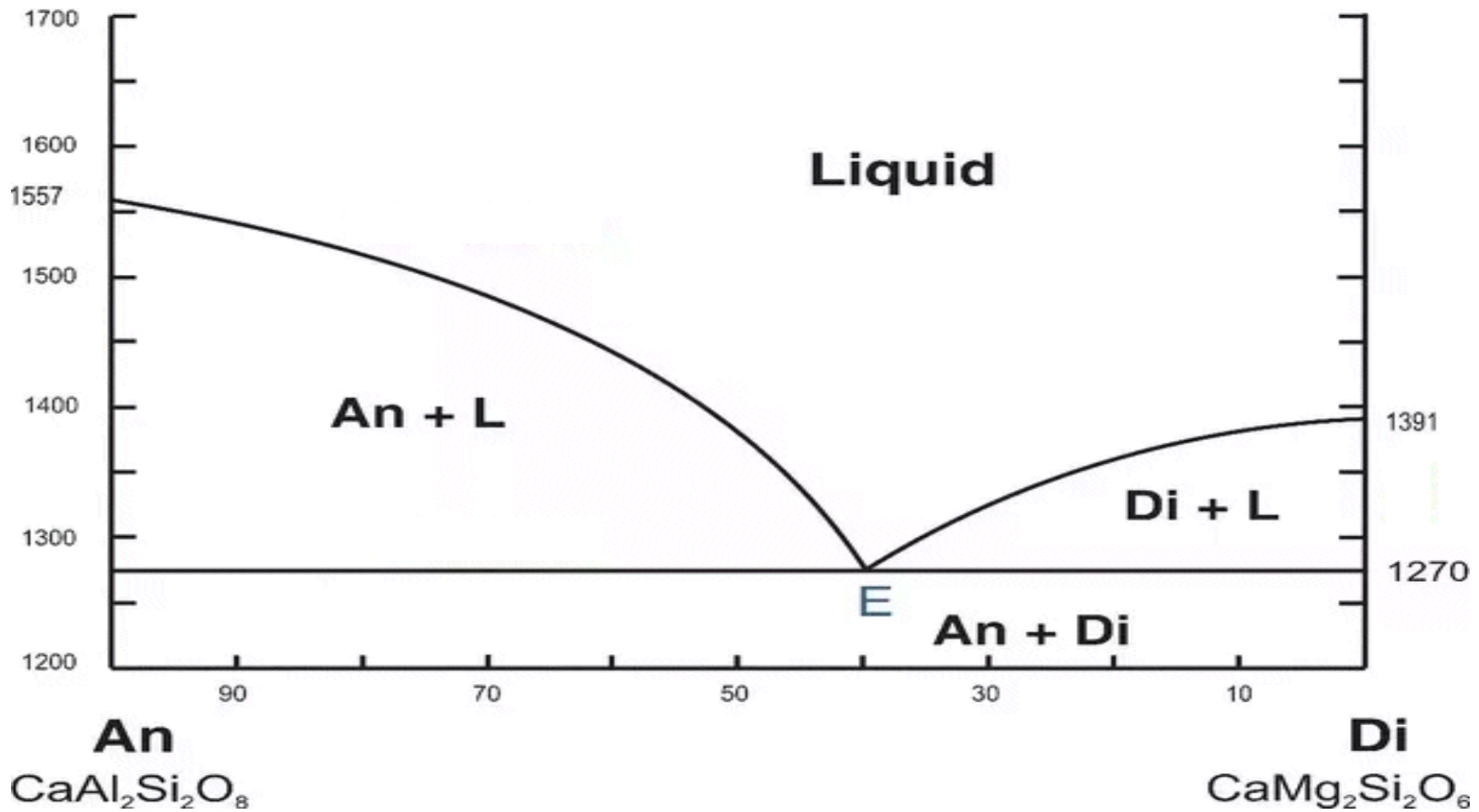
d) At what temperature does the anorthite disappear? 1525°C

e) What is the composition of the final solid phase? 100% Anorthite

f) What is the composition of the final liquid phase? 85% An, 15% Di

Anorthite - Diopside System

P = 1atm.
T in ° C



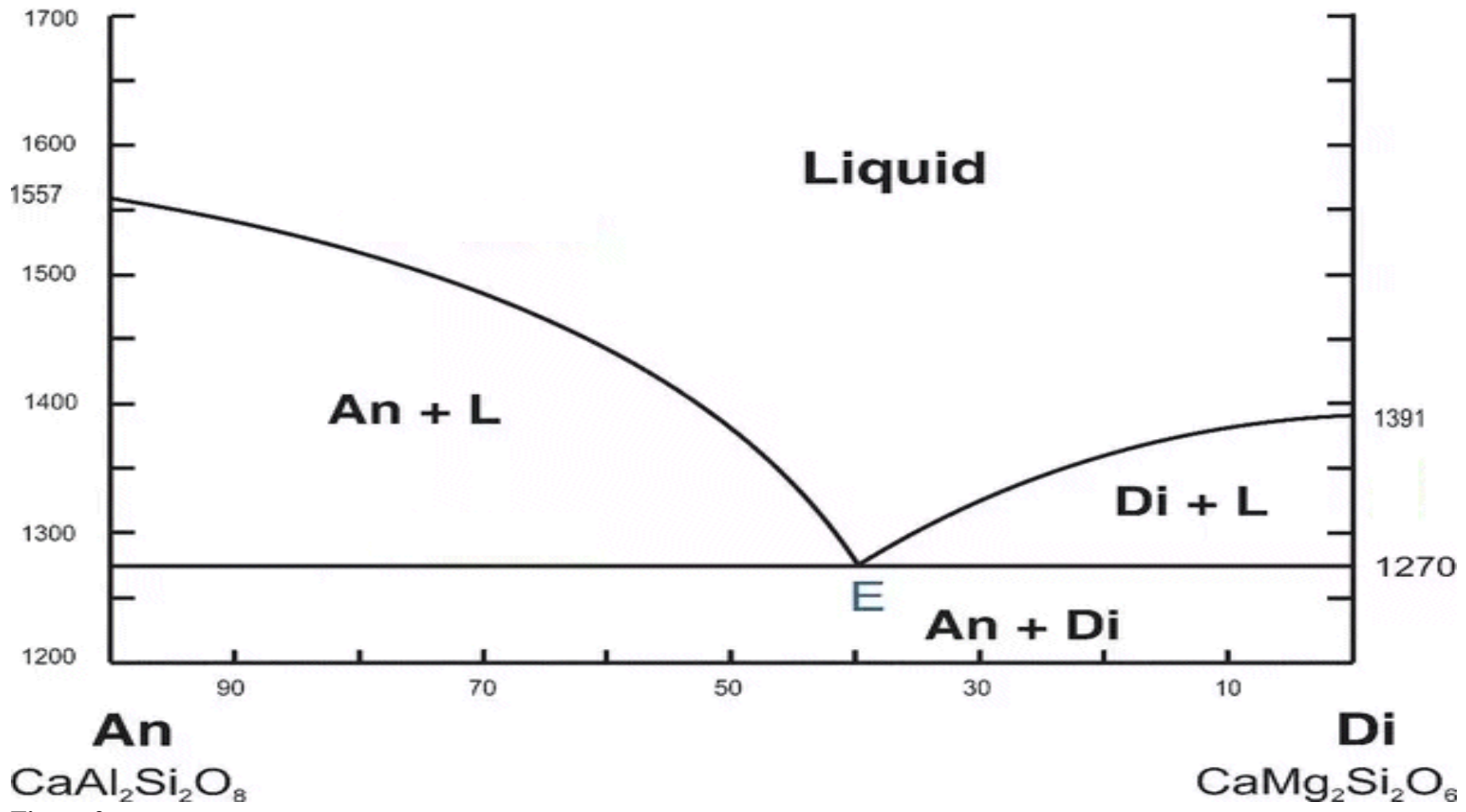
An
 $\text{CaAl}_2\text{Si}_2\text{O}_8$

Di
 $\text{CaMg}_2\text{Si}_2\text{O}_6$

Figure 1

Anorthite - Diopside System

P = 1atm.
T in ° C



An
 $\text{CaAl}_2\text{Si}_2\text{O}_8$

Di
 $\text{CaMg}_2\text{Si}_2\text{O}_6$

Figure 2

