

### 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  $1650^\circ\text{C}$  and 20% An (note scale reads from right to left) trace the cooling behavior of the melt down to  $1200^\circ\text{C}$ . 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? \_\_\_\_\_  $^\circ\text{C}$
- b) What is the composition of the first crystal? \_\_\_\_\_
- c) At what temperature does the first crystal of anorthite appear? \_\_\_\_\_  $^\circ\text{C}$
- d) At what temperature does the liquid disappear? \_\_\_\_\_  $^\circ\text{C}$
- e) What is the composition of the final liquid phase? \_\_\_\_\_
- f) What is the composition of the final solid mixture? (Phases present and percent of each)

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3. Using Figure 2 starting at  $1200^\circ\text{C}$  and 85% An, trace the behavior of the solids up to  $1700^\circ\text{C}$ . 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? \_\_\_\_\_  $^\circ\text{C}$
- b) What is the composition of the first liquid? \_\_\_\_\_
- c) At what temperature does the diopside disappear? \_\_\_\_\_  $^\circ\text{C}$
- d) At what temperature does the anorthite disappear? \_\_\_\_\_  $^\circ\text{C}$
- e) What is the composition of the final solid phase? \_\_\_\_\_
- f) What is the composition of the final liquid phase? \_\_\_\_\_

# Anorthite - Diopside System

P = 1atm.  
T in ° C

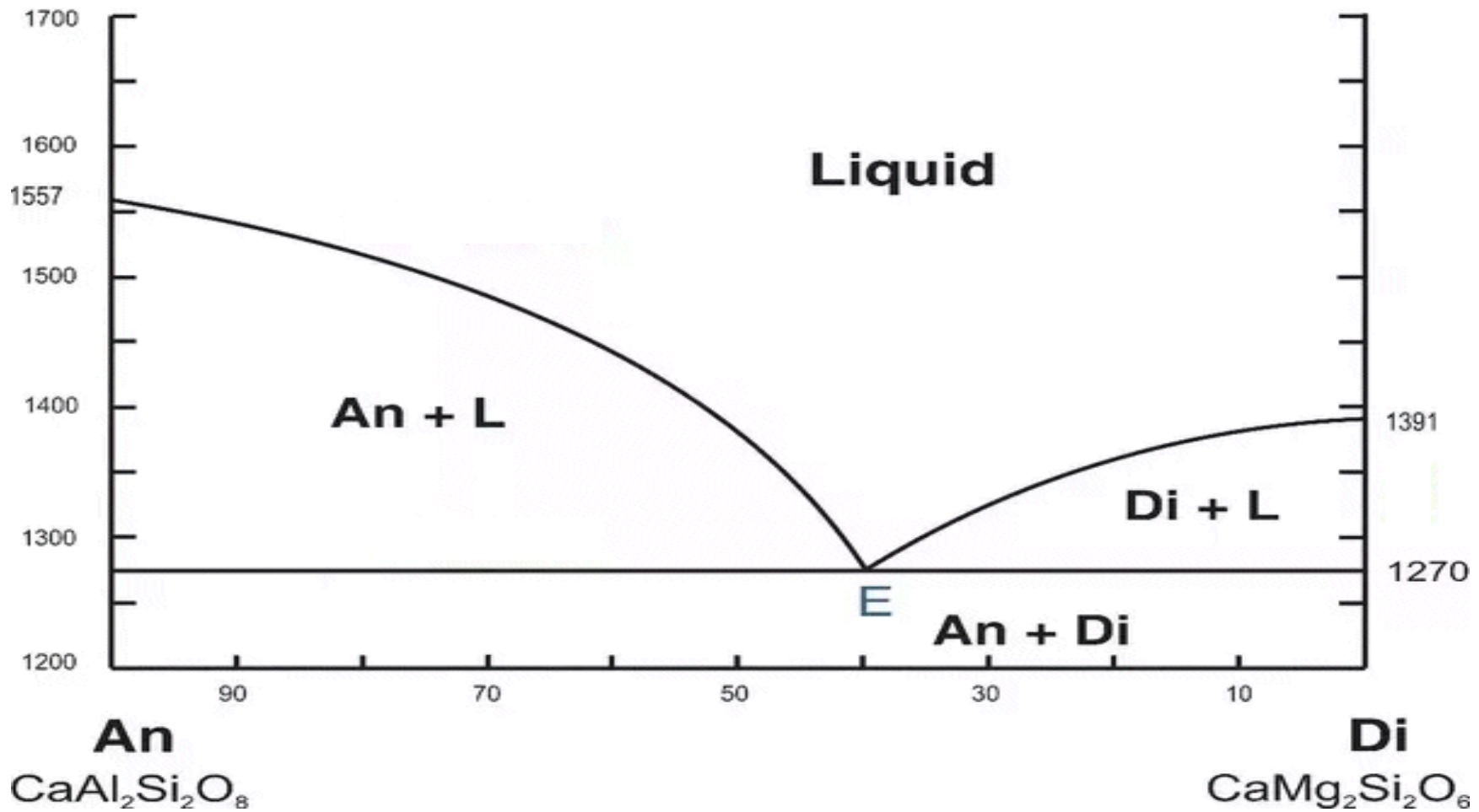


Figure 1

# Anorthite - Diopside System

P = 1atm.  
T in ° C

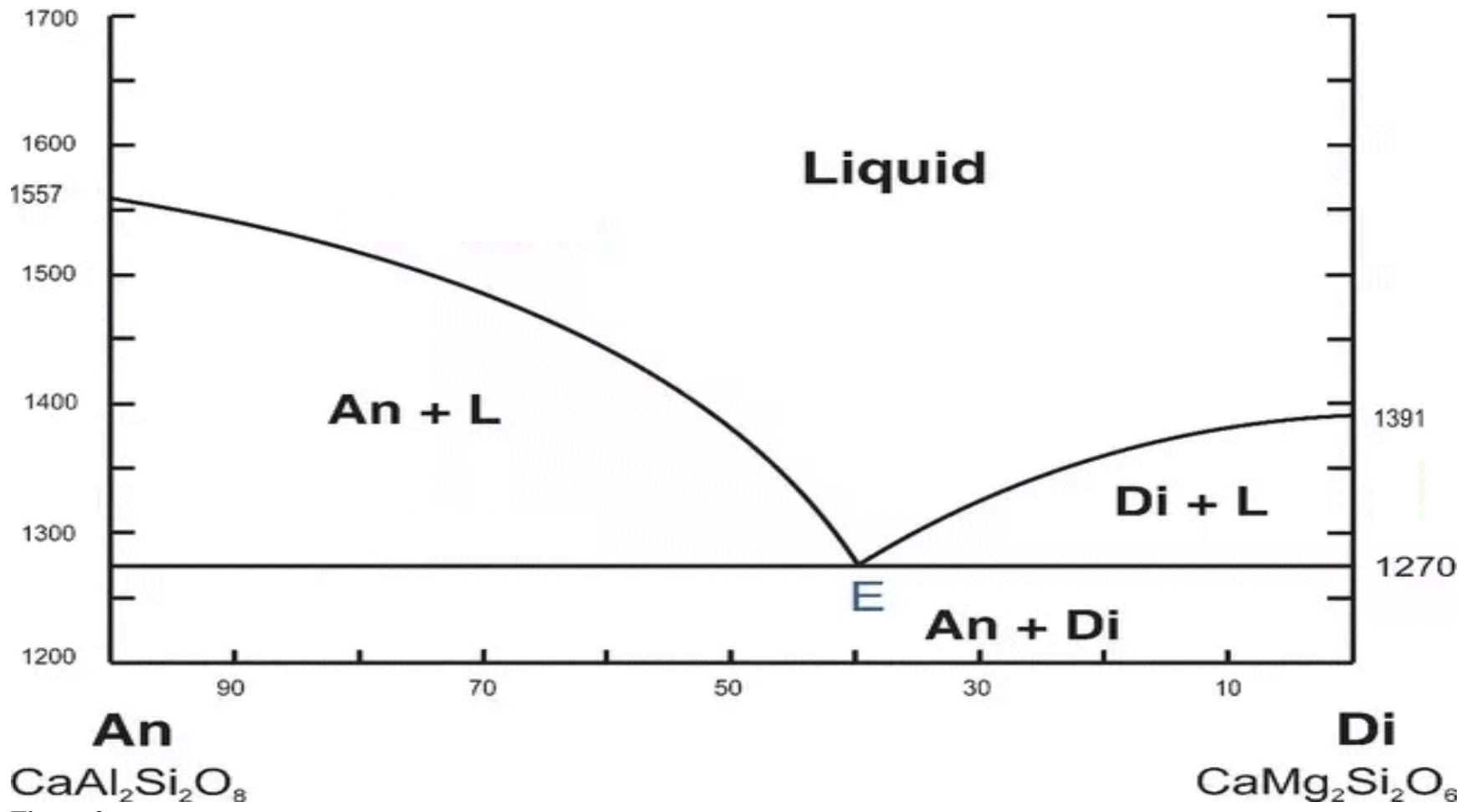


Figure 2

