

GY-343 Petrology  
Ternary Phase Diagram Exercise B

Problem 1: With the Di-Ab-An solid solution ternary calculate the following:

Composition X- assume equilibrium crystallization

1. Trace the evolutionary path of the melt fraction in red pencil on the ternary diagram.
2. Trace the evolutionary path of the solid composition in blue pencil on the ternary diagram.
3. What is the composition of the first-formed plagioclase crystal during cooling of composition X? \_\_\_\_\_
4. What is the composition of the final plagioclase crystal formed during the cooling of composition X? \_\_\_\_\_

Composition X- assume fractional crystallization

1. Sketch the hypothetical pluton that would form from the fractional crystallization of composition X.

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Problem 2: With the Di-Fo-Cr ternary diagram construct the following:

Composition X: assume equilibrium crystallization

1. Trace the path of the melt in red.
2. Trace the path of the solid in blue.
3. Sketch the resulting pluton after complete crystallization. Classify the rock.

Composition Y: assume fractional crystallization

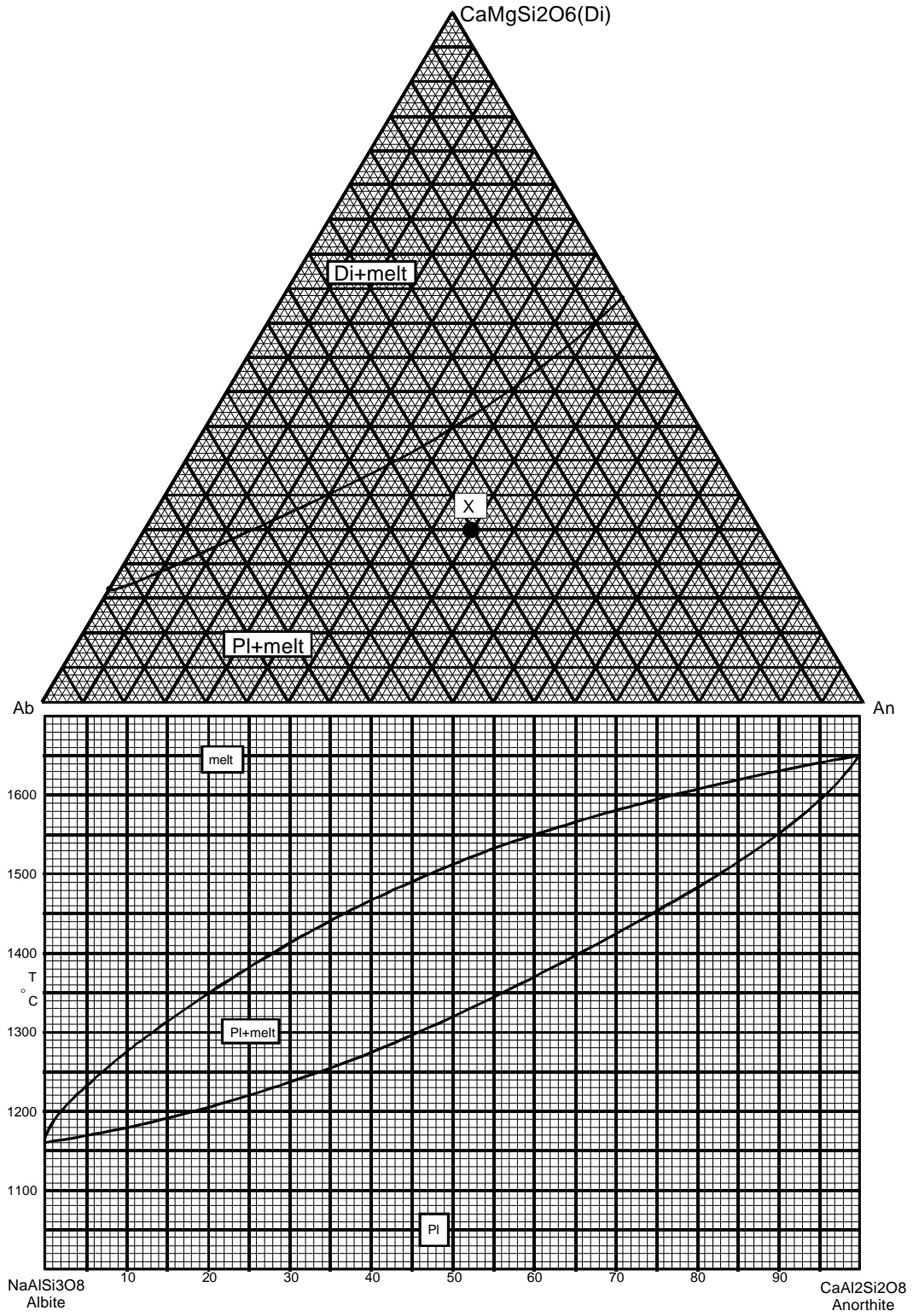
1. Trace the path of the melt in red.
2. Trace the path of the solid in blue.
3. Sketch the resulting pluton after complete crystallization of Y. Classify the rock layers.

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Composition Z: Assume fractional crystallization

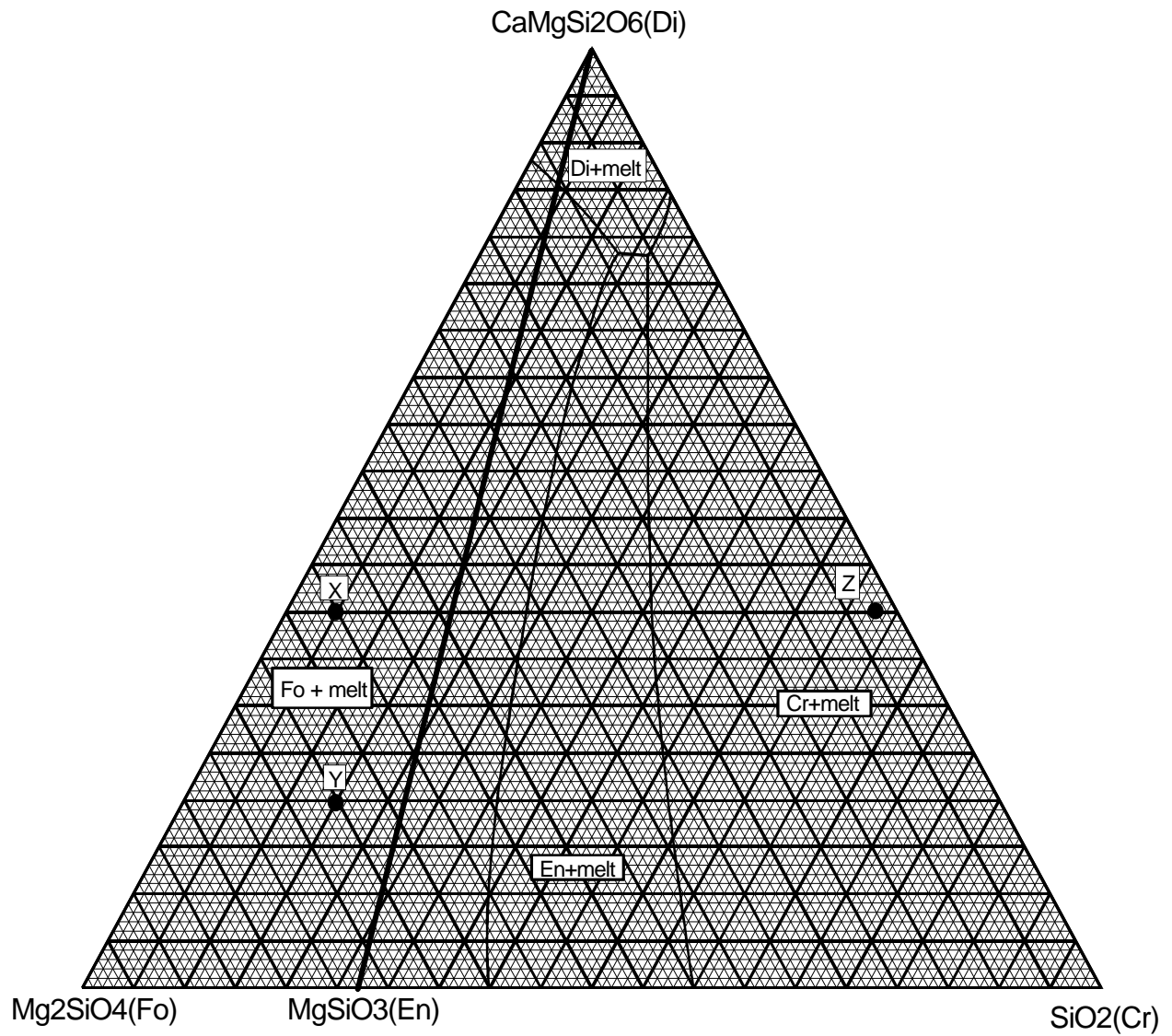
1. Sketch the hypothetical pluton that would result from the fractional crystallization of composition Z. Label the various layers formed in terms of percentage of total volume, and in percentage of mineral constituents.

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**Figure 1:** Di-Pl ternary phase diagram.

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**Figure 2:** Fo-Cr-Di peritectic ternary phase diagram.