

## Di - Ab - An Ternary System

System exhibits complete solid solution between **Ab** and **An** - **plagioclase** of variable composition

**Diopside** composition is fixed

### Comments

No three phase assemblage of solids is possible due to the complete solid solution of **Ab** and **An**

System lacks ternary eutectic

Examine two paths of **Equilibrium Crystallization**

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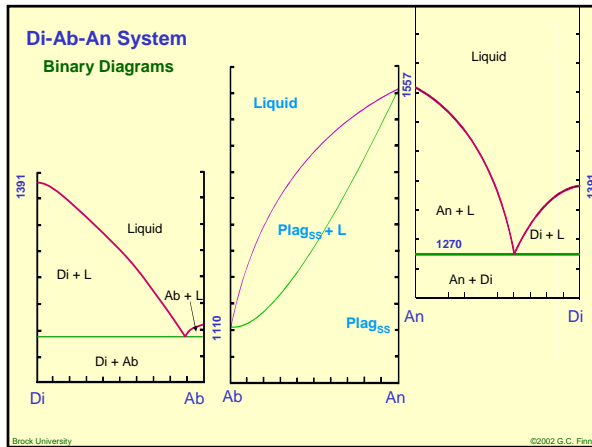
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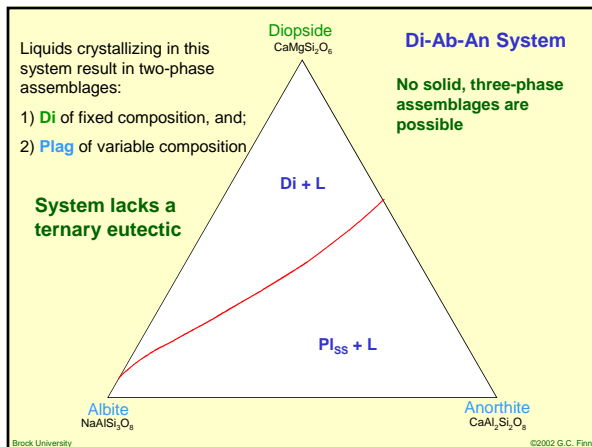
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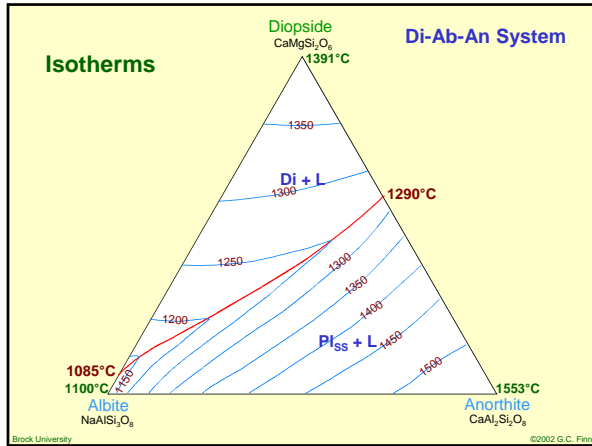
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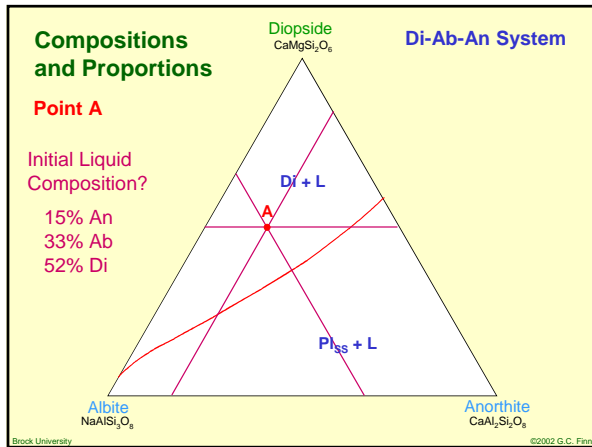
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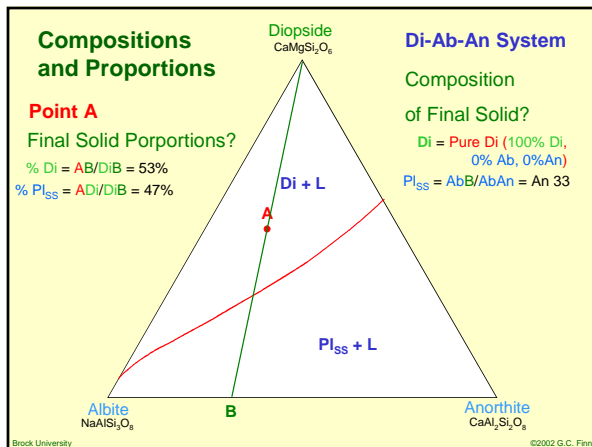
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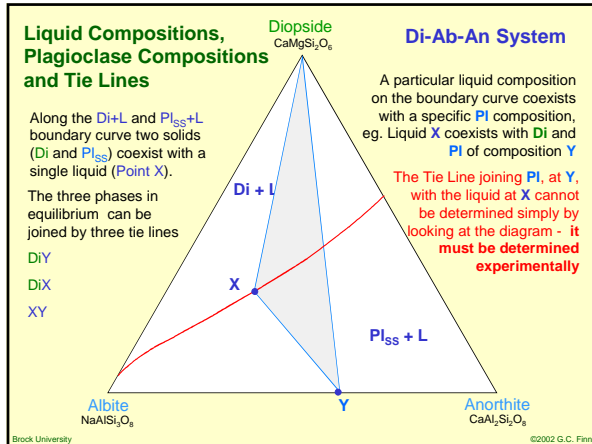
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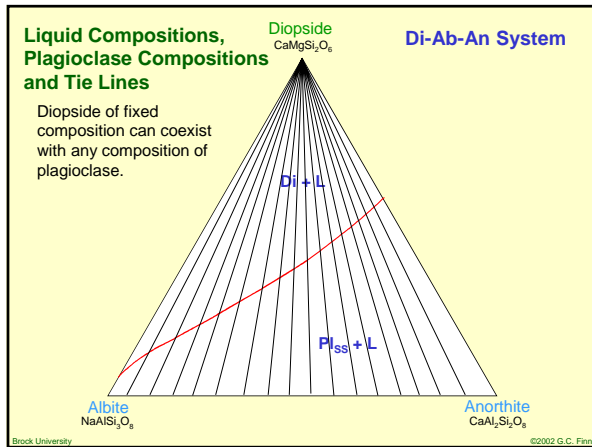
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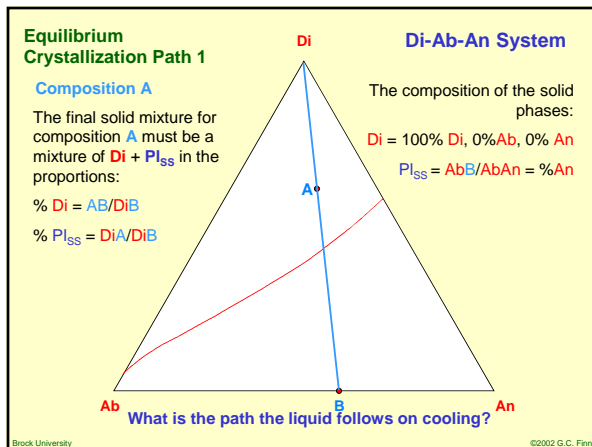
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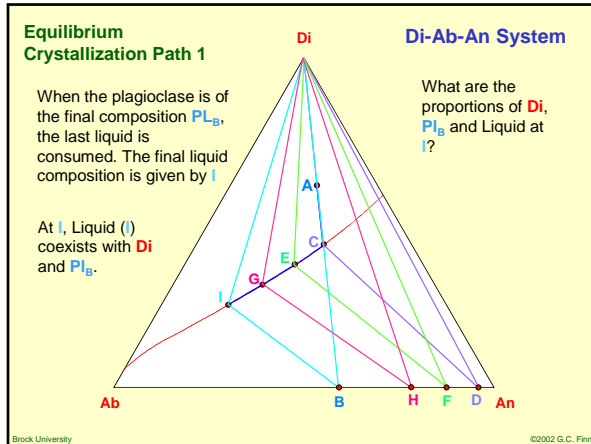
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**NOTE**

- Equilibrium between plagioclase and liquid must be maintained as:
  - the liquid migrates down the boundary curve it continuously reacts with the previously formed plagioclase, causing it to become more sodic (Ab-rich), and;
  - while at the same time the liquid continues to crystallize plagioclase with a higher soda (Ab) content.

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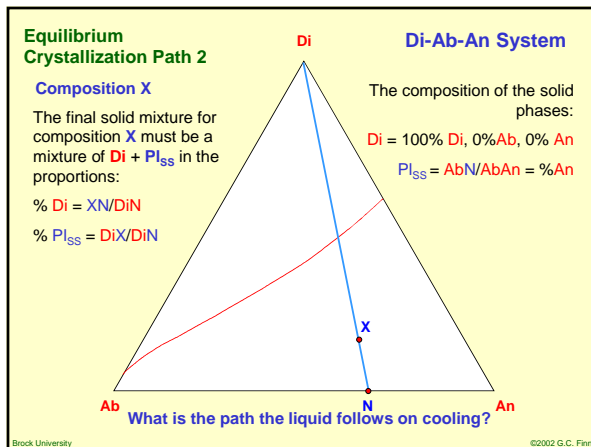
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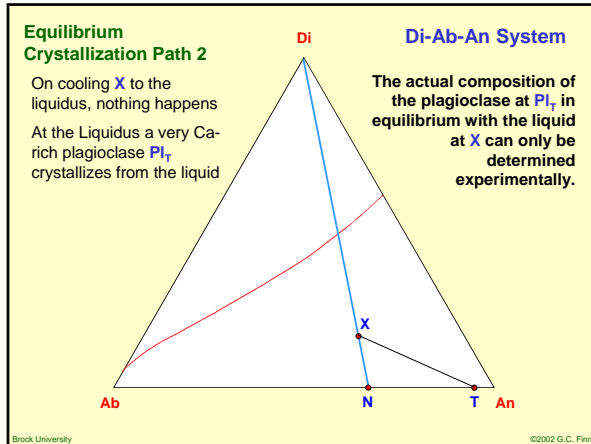
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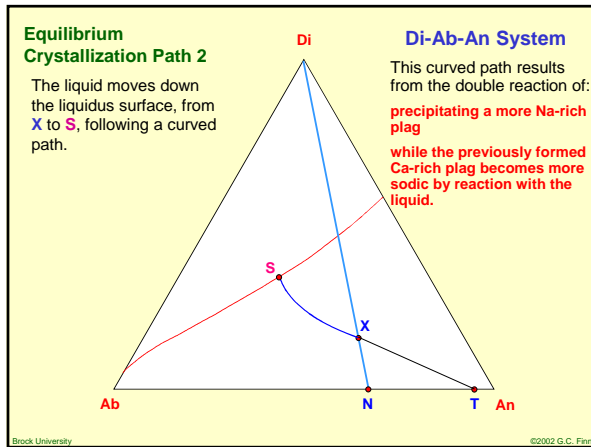
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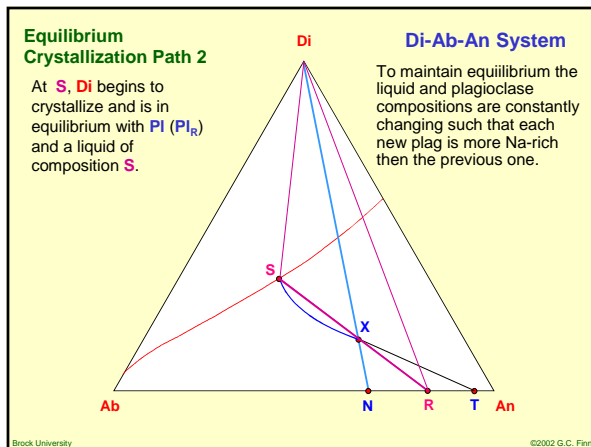
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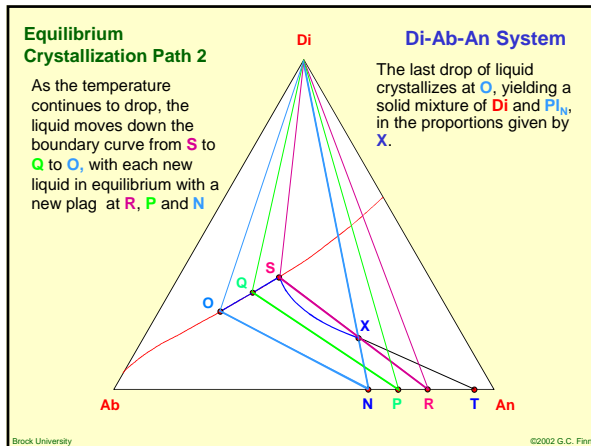
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**REMINDER**

- Tie lines which join liquid compositions along the boundary curve with plagioclase compositions along the **AbAn** join must be determined experimentally.

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**Di-Ab-An Ternary System**

**Batch Fractional Crystallization**

- Early formed plagioclase does not react with the liquid, resulting in the liquid migrating to a lower point on the boundary curve than for the same bulk composition which undergoes equilibrium crystallization
- Evidence for this process can be seen in the presence of zoned plagioclase exhibiting normal, reverse or oscillatory zoning

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### Di-Ab-An Ternary System

#### Pure Fractional Crystallization

- The last liquid will have a composition represented by the binary eutectic on the Ab-Di join and would produce a solid mixture of Di and Ab, in the proportions given by the binary eutectic

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