Welcome to 3.091

Lecture 34

December 7, 2009

Binary Phase Diagrams: Complete Solubility
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Source: Fig. 9-7 in Askeland, Donald R. *The Science and Engineering of Materials*. 2nd ed. Boston, MA: PWS-Kent, 1989.
The diagram represents a phase diagram of NiO and MgO. The axes are labeled as follows:

- Y-axis: Temperature (°C)
- X-axis: Mole percent MgO

The diagram shows a region marked as $L + S$, indicating a two-phase equilibrium. There are points labeled $P = 1$ and $P = 2$, which may represent different conditions or phase transitions. The diagram is likely used to illustrate the stability regions of different phases in a solid solution.
$P = 2?$

LEVER RULE
Hexane - Nitrobenzene
$P = 2?$

LEVER RULE
Hexane - Nitrobenzene
Polystyrene - Polybutadiene phase diagram

- at "low" n
  phase diagram = f (n)

- at "high" n, poor mixing
Water - Triethylamine

temperature-composition diagram

Composition of one phase

Composition of second phase

Temperature, $T$

Mole fraction of triethylamine, $x((C_2H_5)_3N)$

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What is *ouzo*?

- liquor from the absinthe family
- wormwood is the chief flavoring agent
- also contains licorice, hyssop, fennel, angelica root, aniseed
Ouzo-water

miscibility gap

Solubility limit

Tie line

α

P = 1

P = 2

milky liquid
clear liquid

Water Vol% Ouzo

20 40 60 80
$P = 2$

miscibility gap

Tie line

$\text{milky liquid}$

water
- *absinthe* first produced commercially in 1797 by Henri-Louis Pernod

- wormwood came to be considered dangerous: it antagonizes GABA which moderate the firing of neural synapses

☞ *absinthe* banned in Switzerland (1910) and in France (1915)
P = 2

miscibility gap

Tie line

louche

⊕ = 2

milky liquid

water

absinthe
Picasso

c. 1901
Picasso

Image courtesy of Mark Harden's Artchive.
Poster critical of the ban on absinthe in Switzerland, by Albert Gantner, 1910.
“Love is like oxygen.”