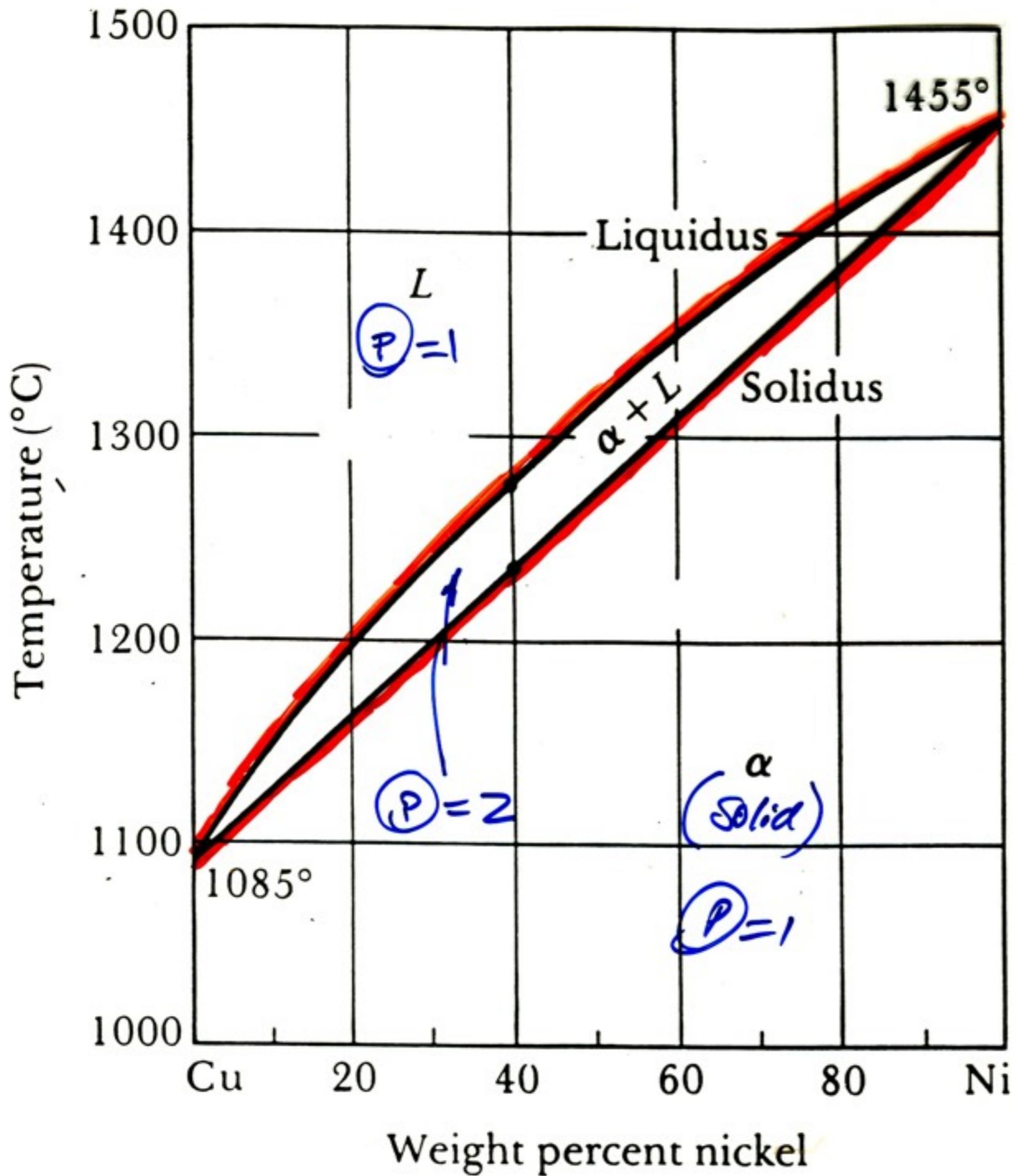


Welcome to 3.091

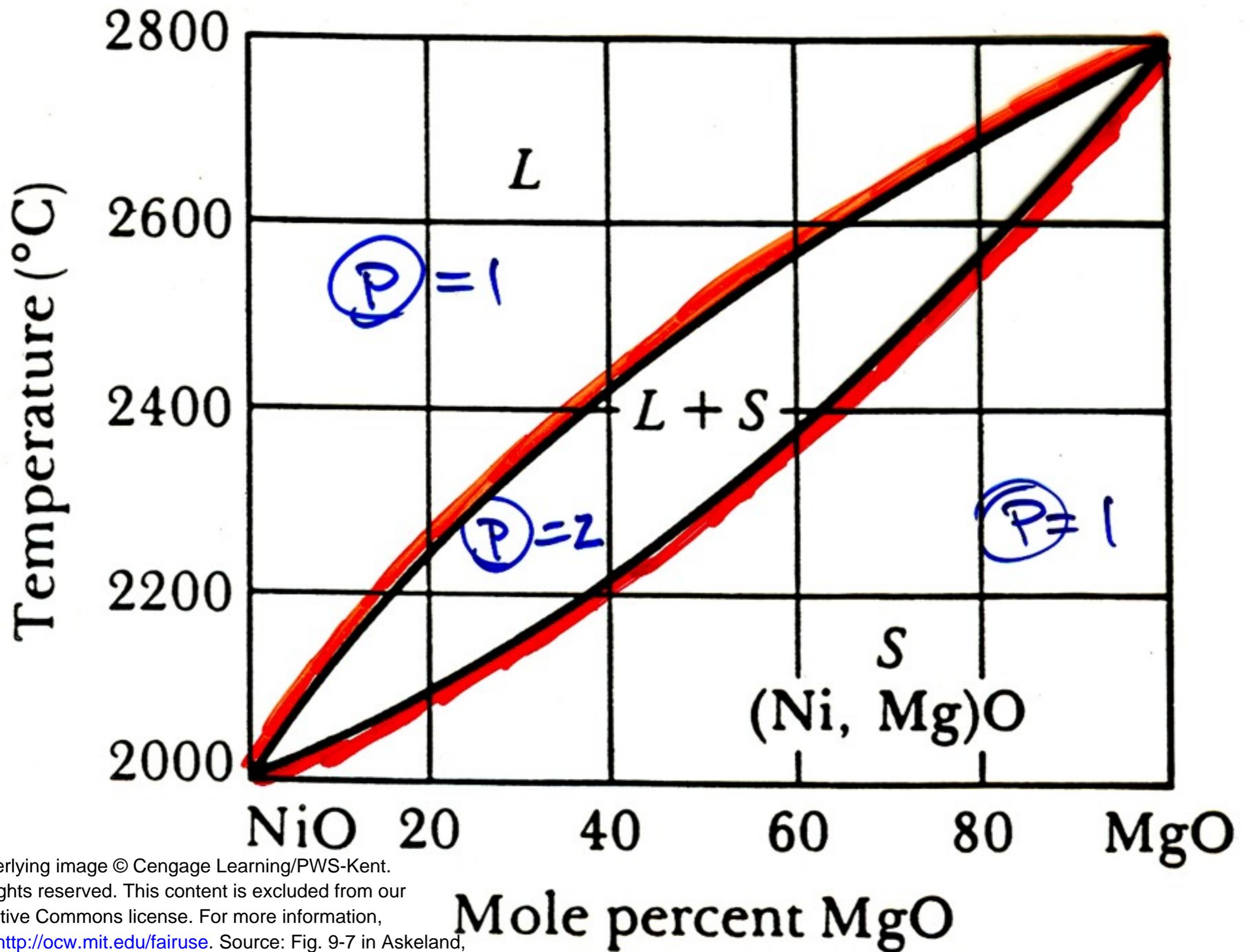
Lecture 34

December 7, 2009

Binary Phase Diagrams: Complete Solubility

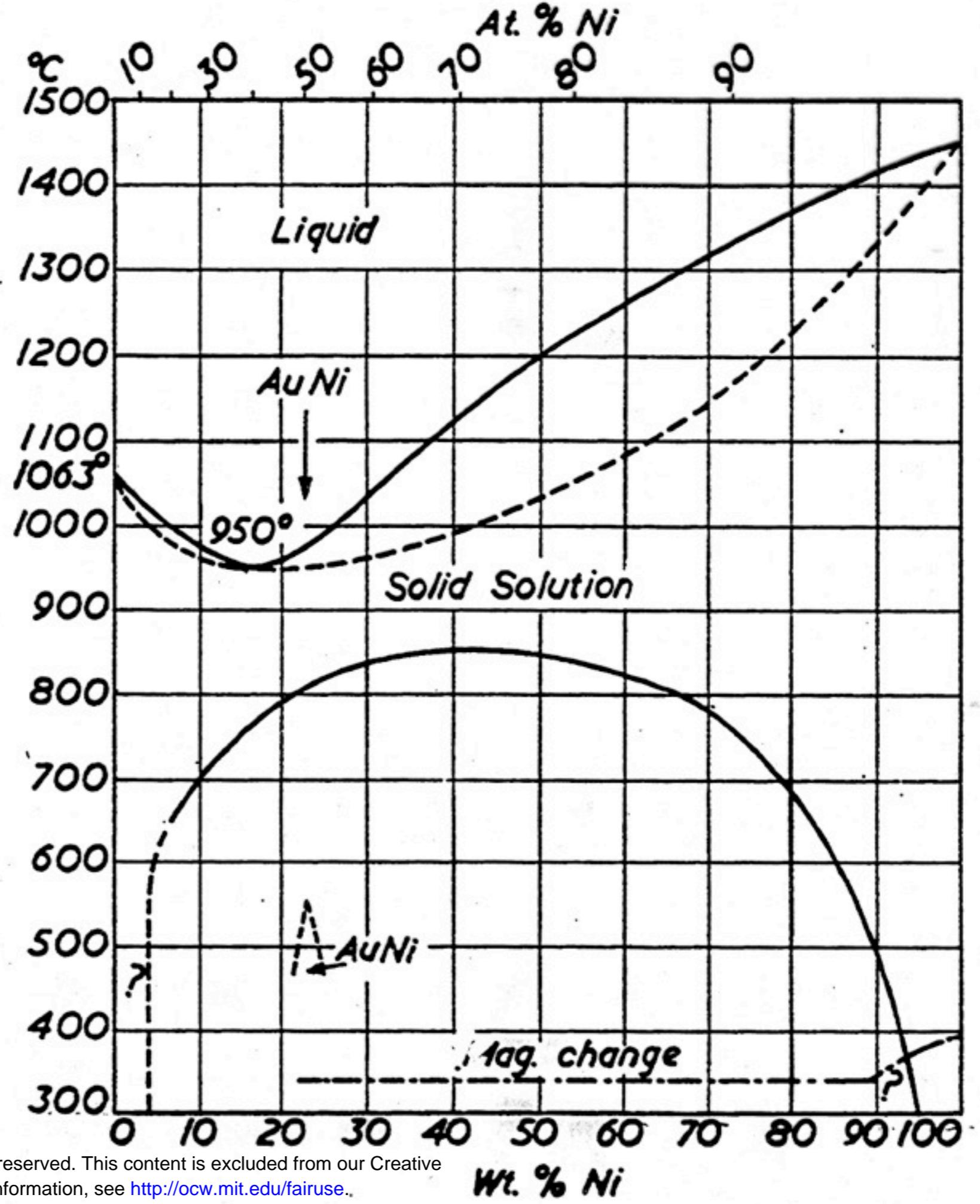


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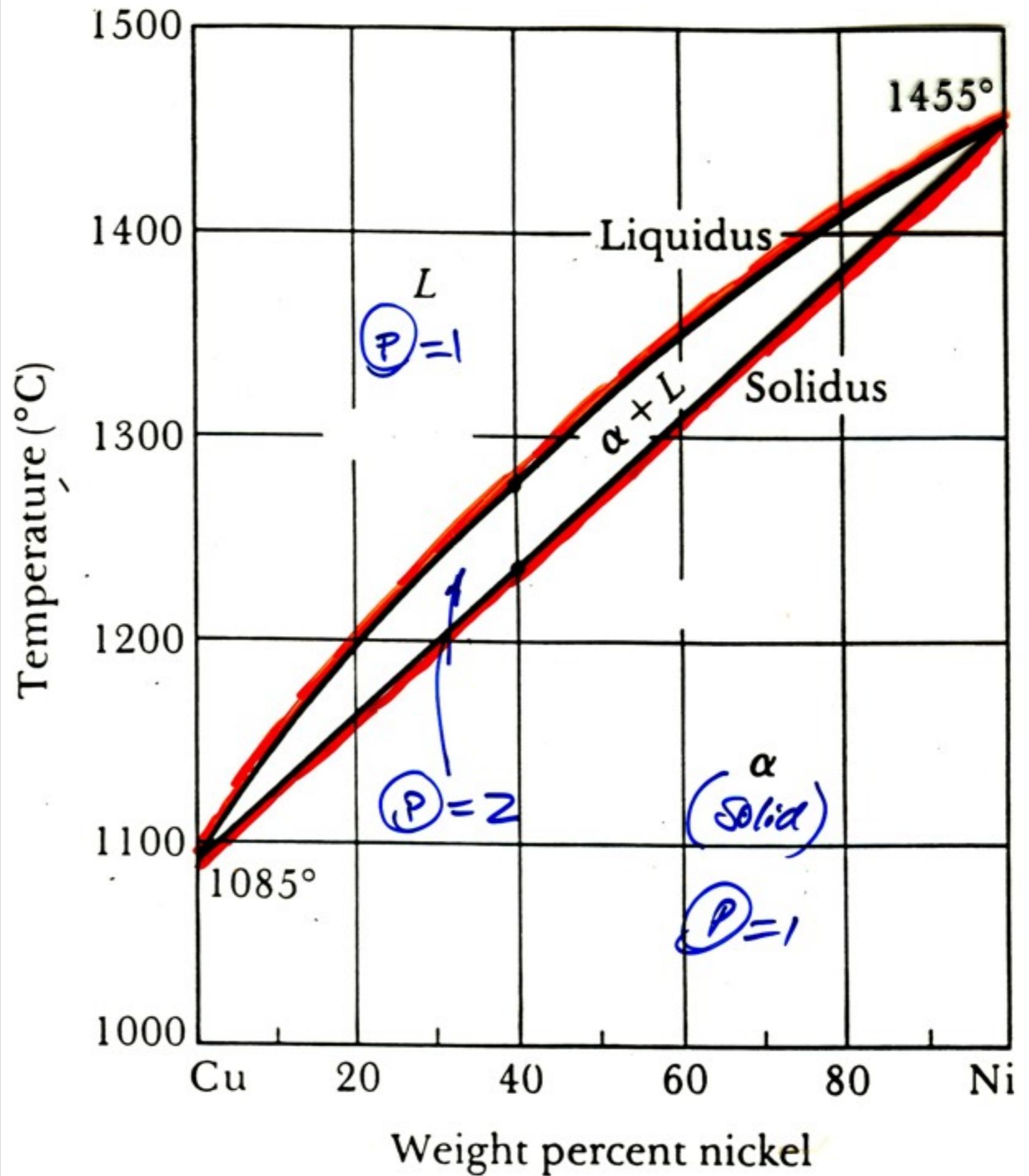


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 Donald R. *The Science and Engineering of Materials*. 2nd ed. Boston, MA: PWS-Kent, 1989.

Au-Ni



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1400
1300
1200
1100

Liquidus

Solidus

L
 $(P) = 1$

liquid

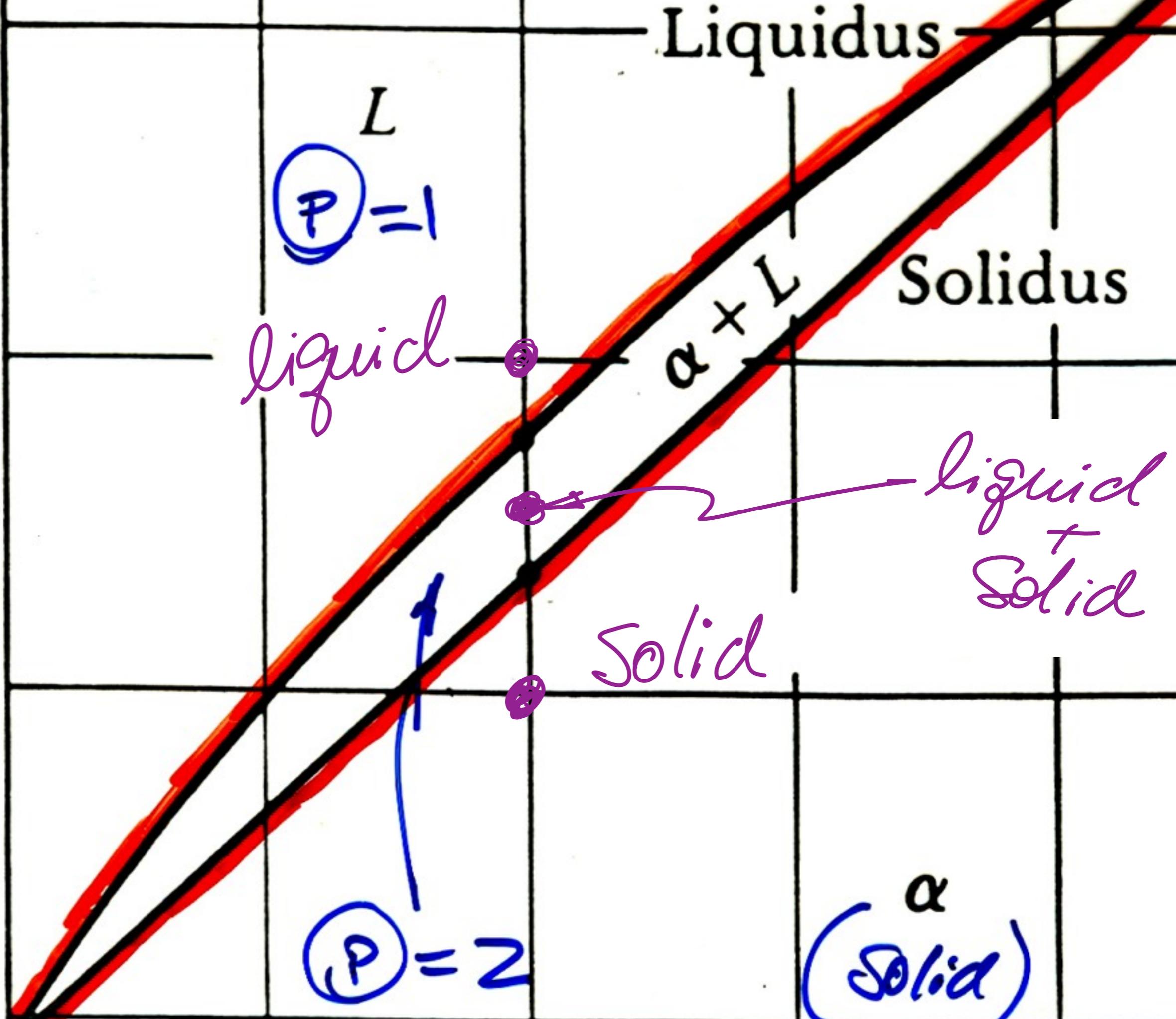
$\alpha + L$

liquid + Solid

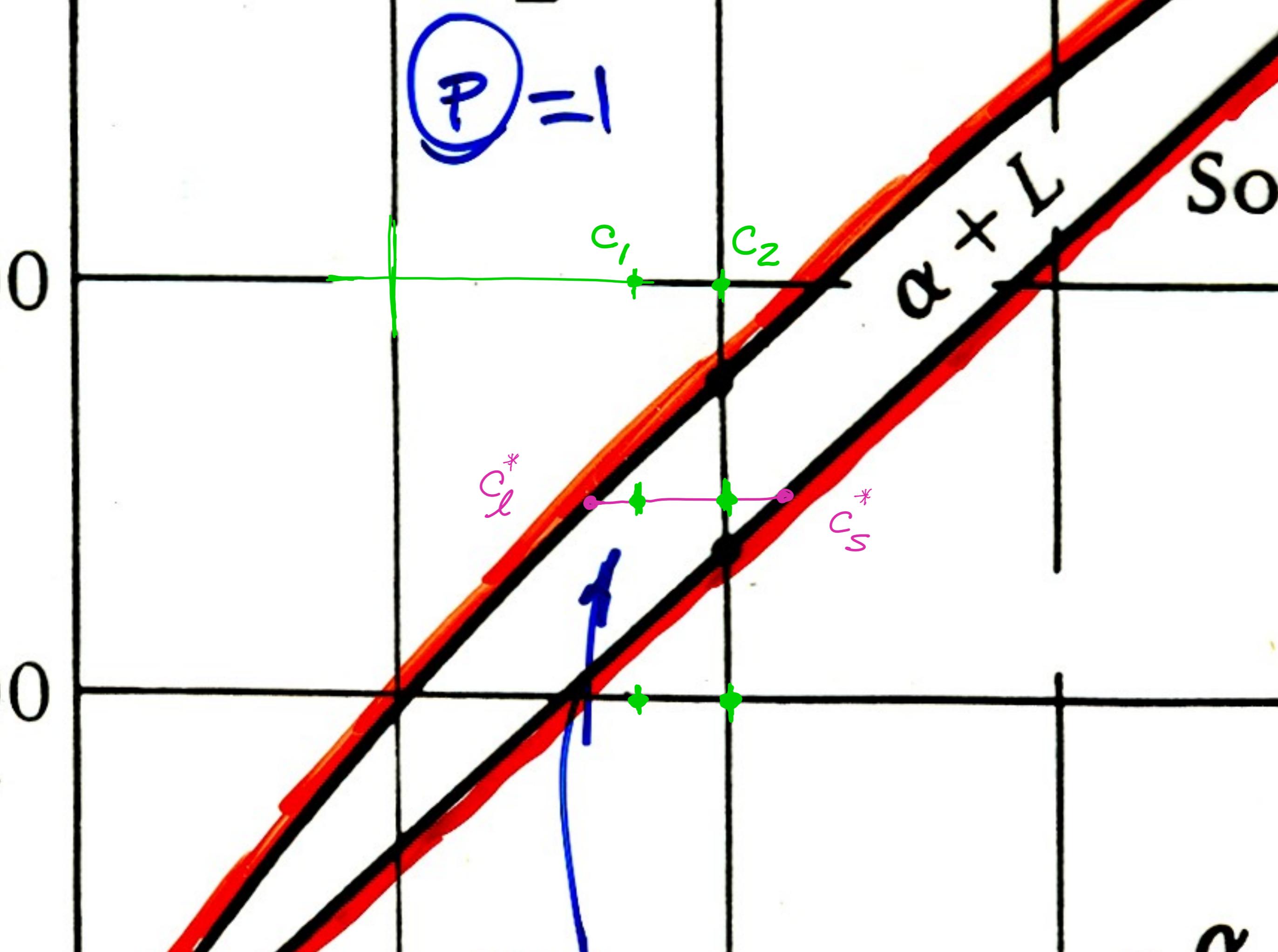
Solid

$(P) = 2$

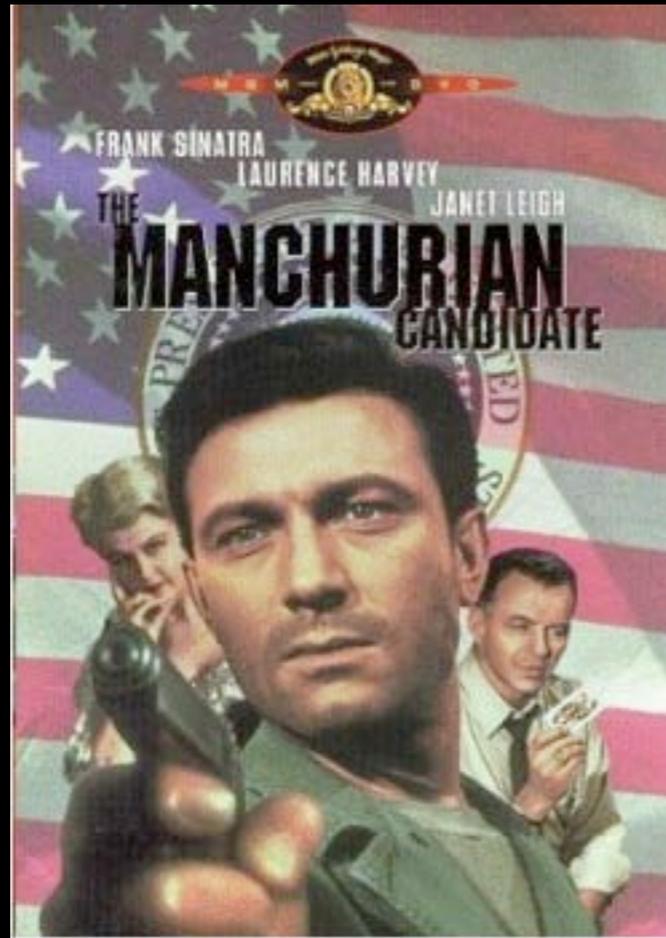
α
(Solid)



$\textcircled{P} = 1$

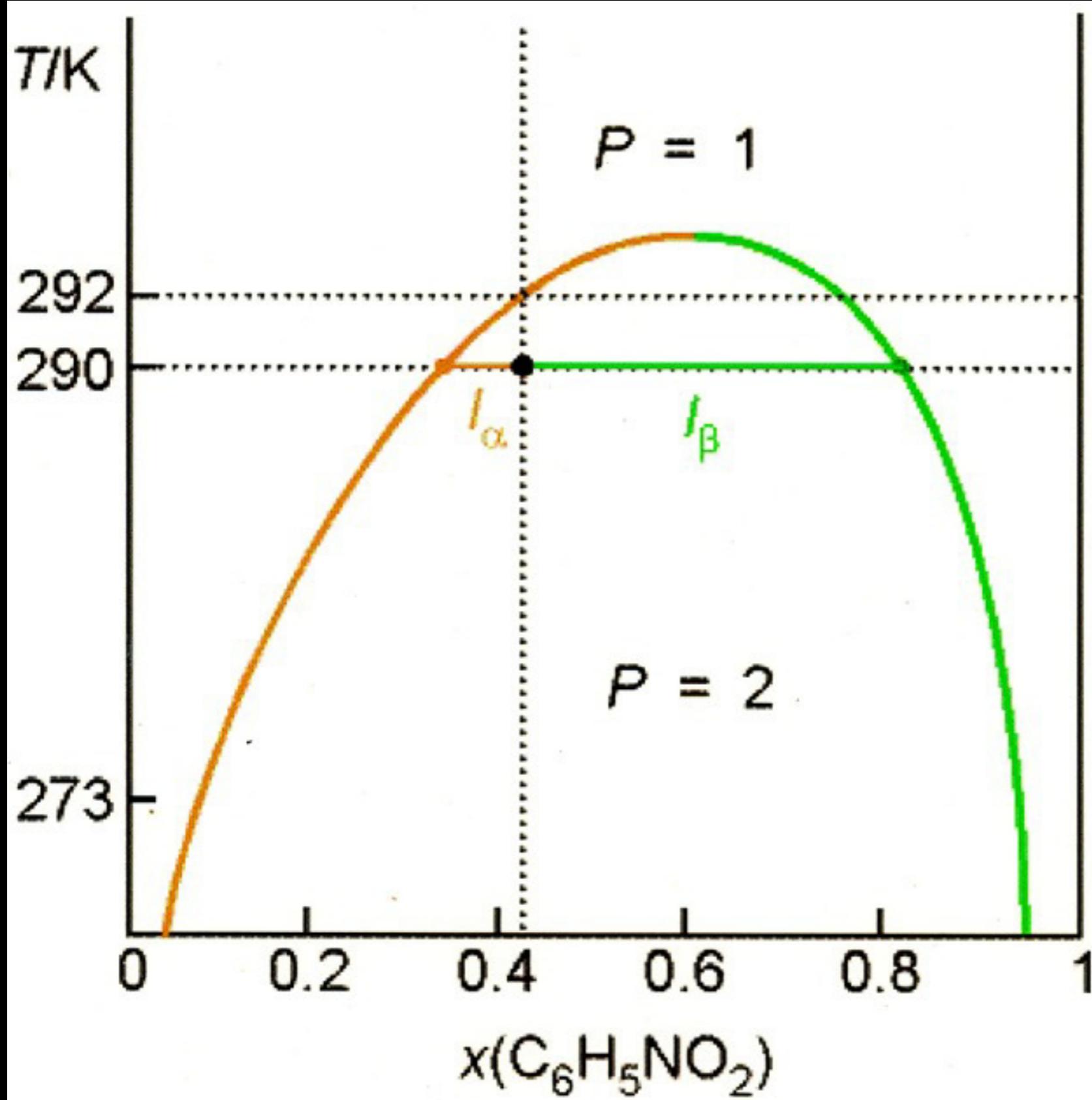


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P = 2?
LEVER RULE





Hexane - Nitrobenzene

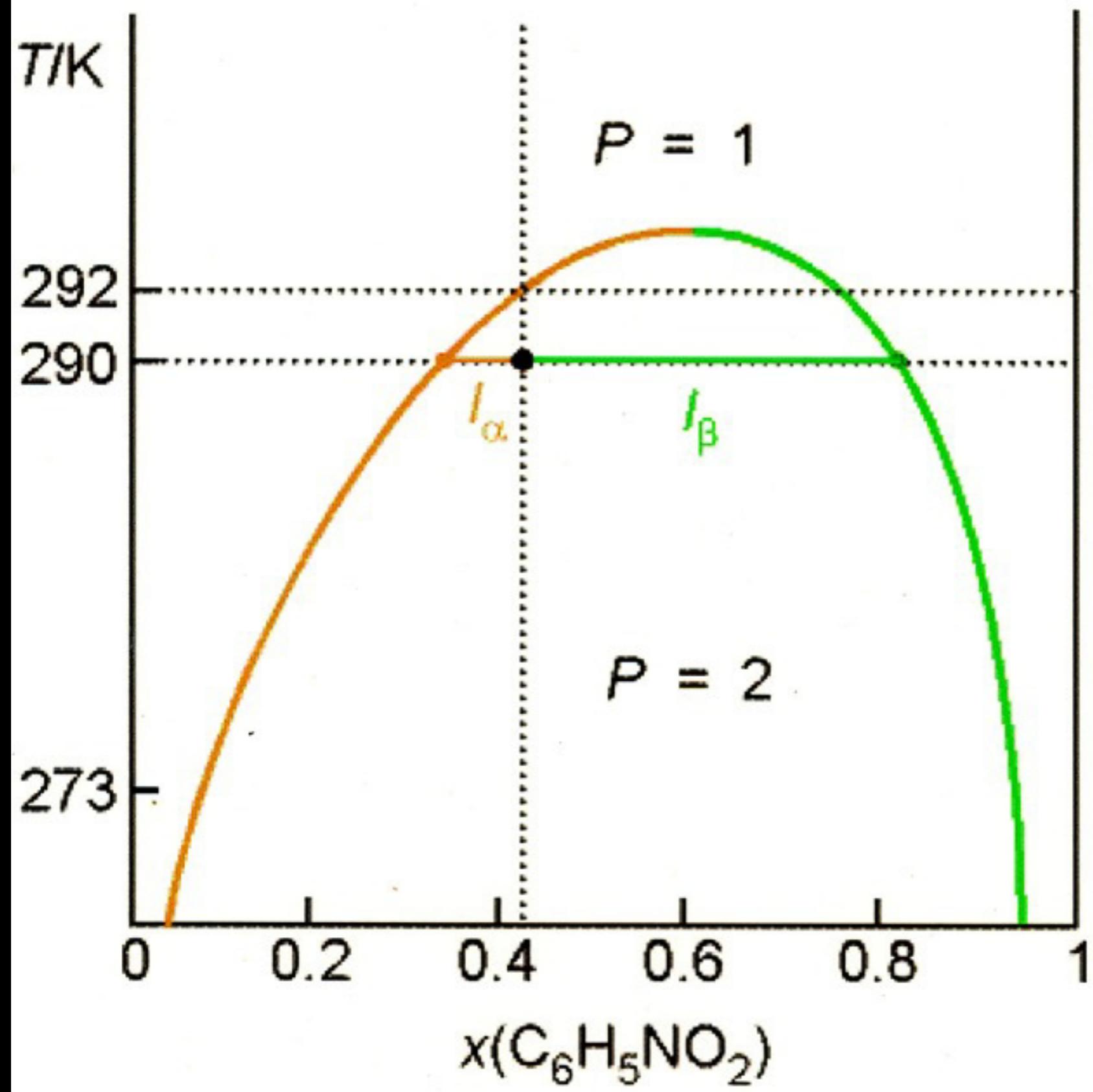
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 Source: Fig 8.20 in Atkins, P. W. et al. *Physical Chemistry, Part 2*. St Martin's Press, 2002.

$P = 2?$



LEVER RULE

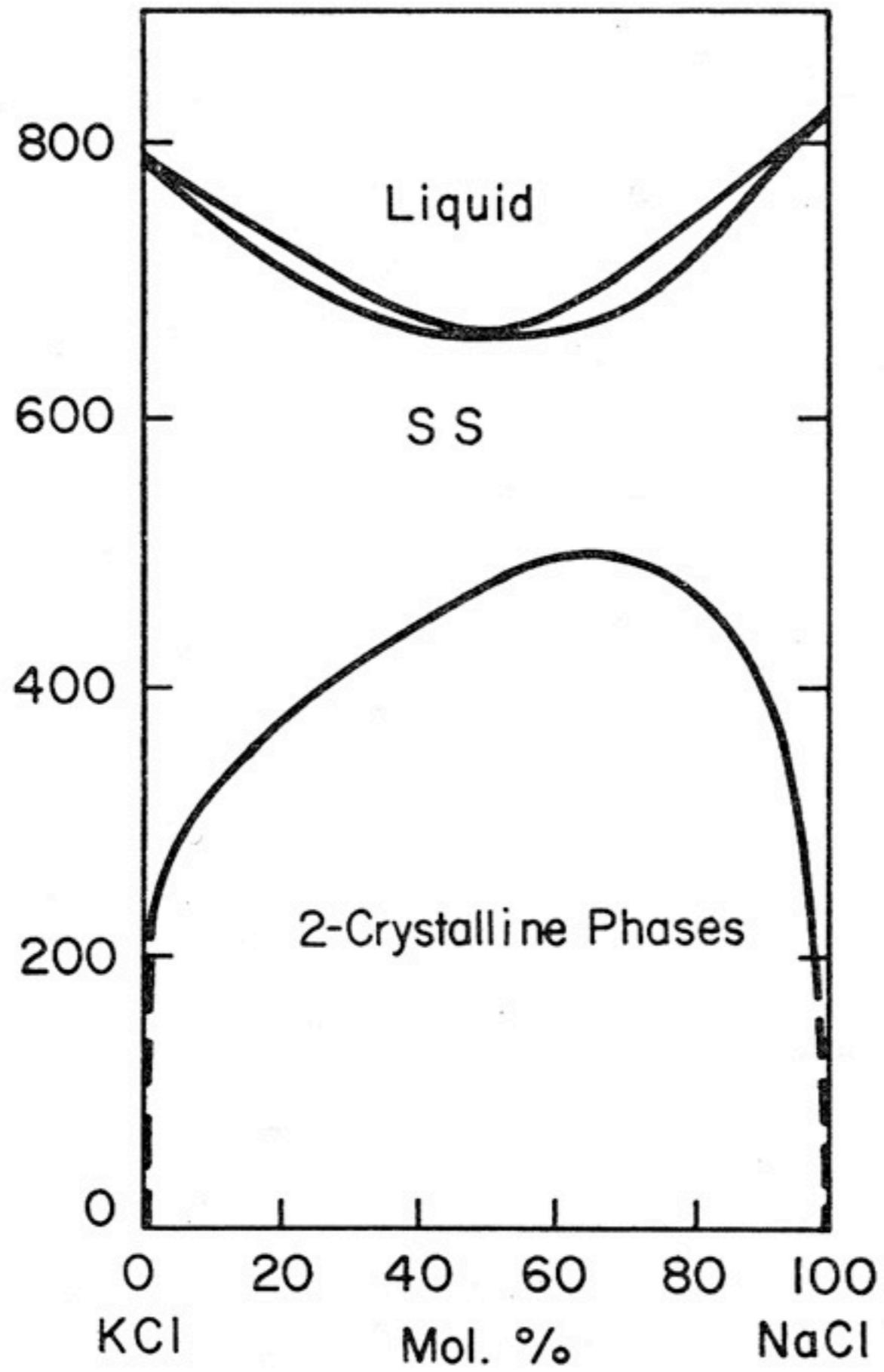




Hexane - Nitrobenzene

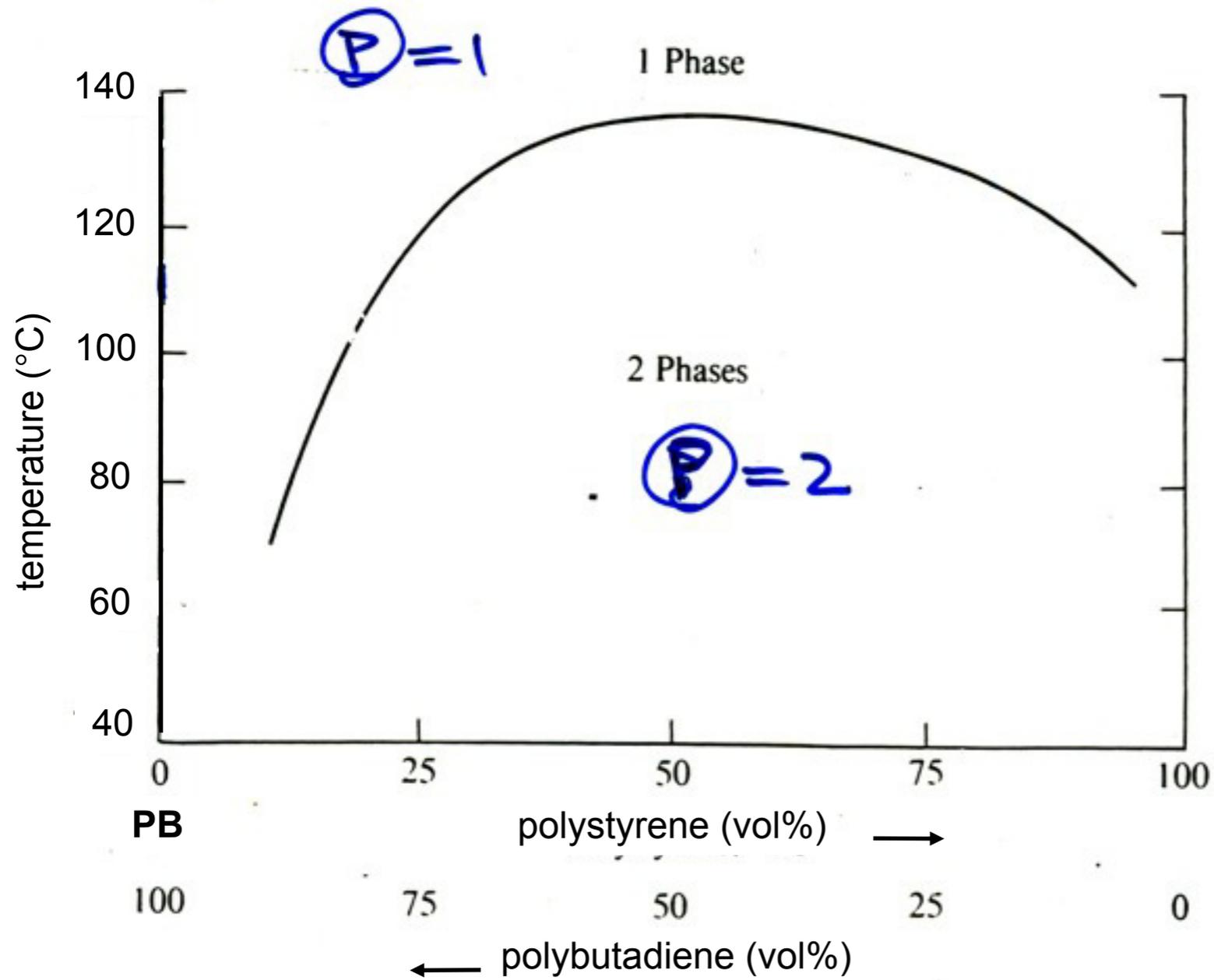
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 Source: Fig 8.20 in Atkins, P. W. et al. *Physical Chemistry*, Part 2. St Martin's Press, 2002.

KCl-NaCl



Source: Figure 1258 in *Phase Diagrams for Ceramists, Vol. 1*. American Ceramic Society. Reprinted with permission of The American Ceramic Society, www.ceramics.org. Some rights reserved.

Polystyrene - Polybutadiene phase diagram



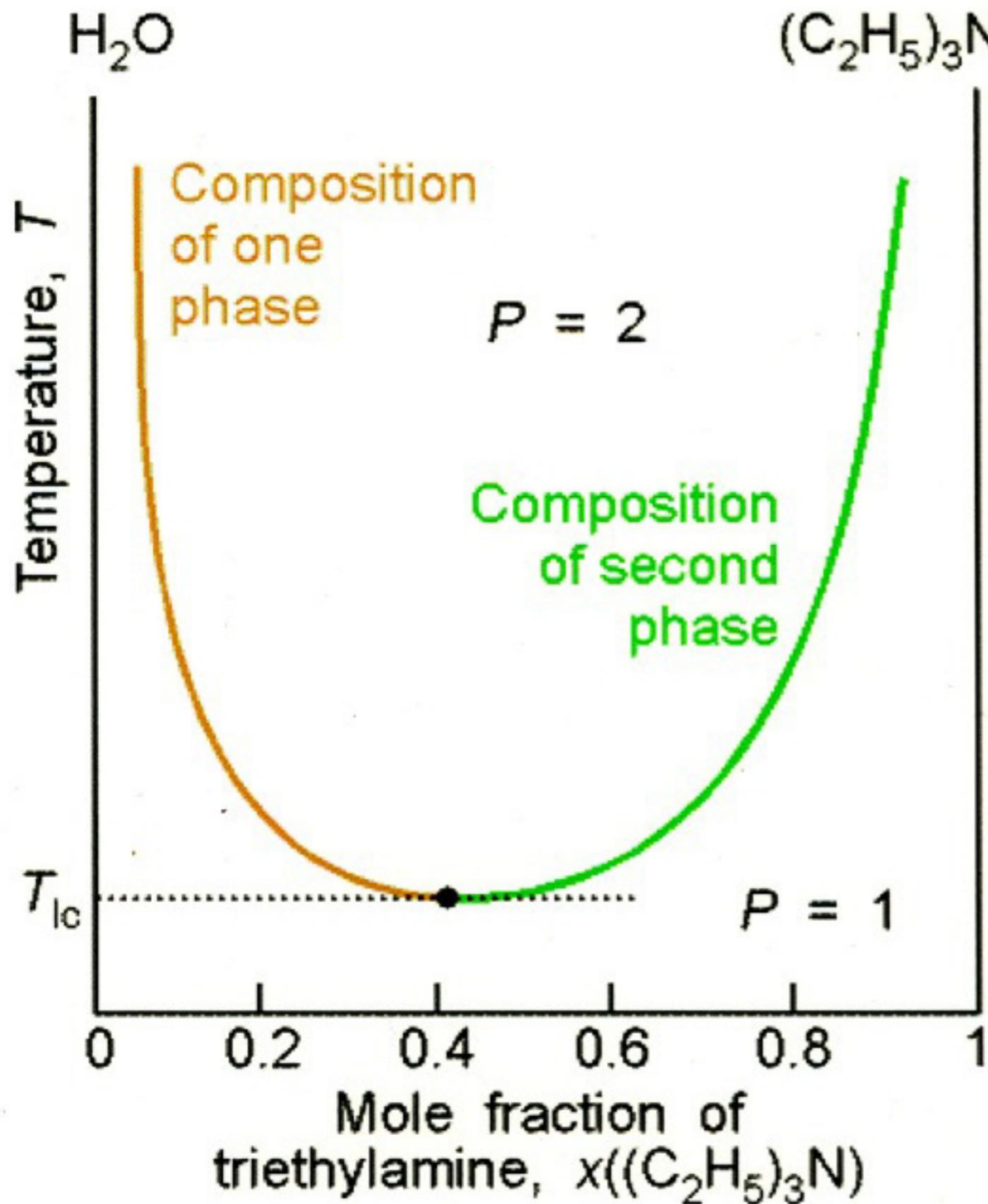
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- at "low" n

phase diagram = $f(n)$

- at "high" n , poor mixing -

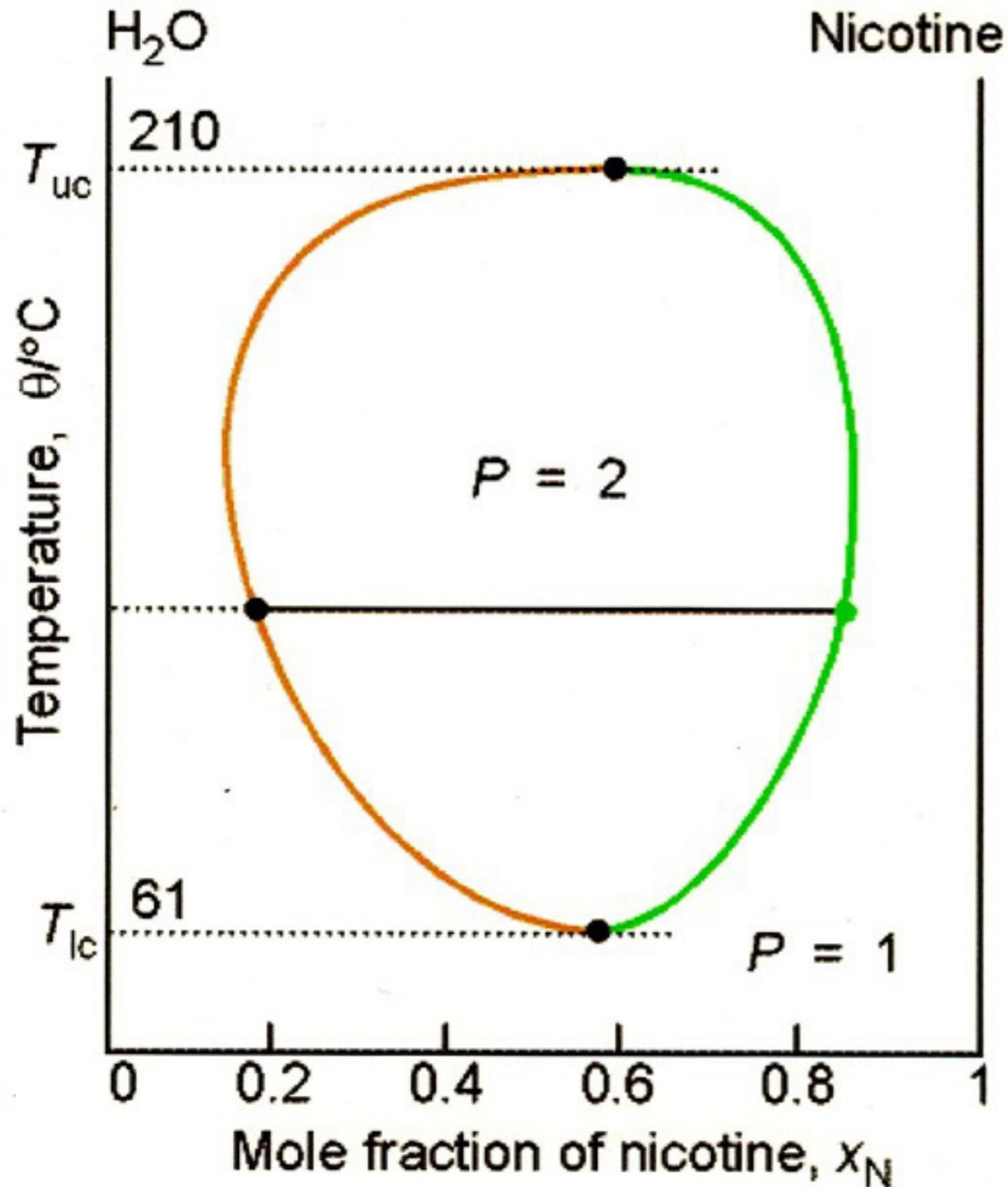
Water - Triethylamine temperature-composition diagram



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Water - Nicotine temperature composition diagram



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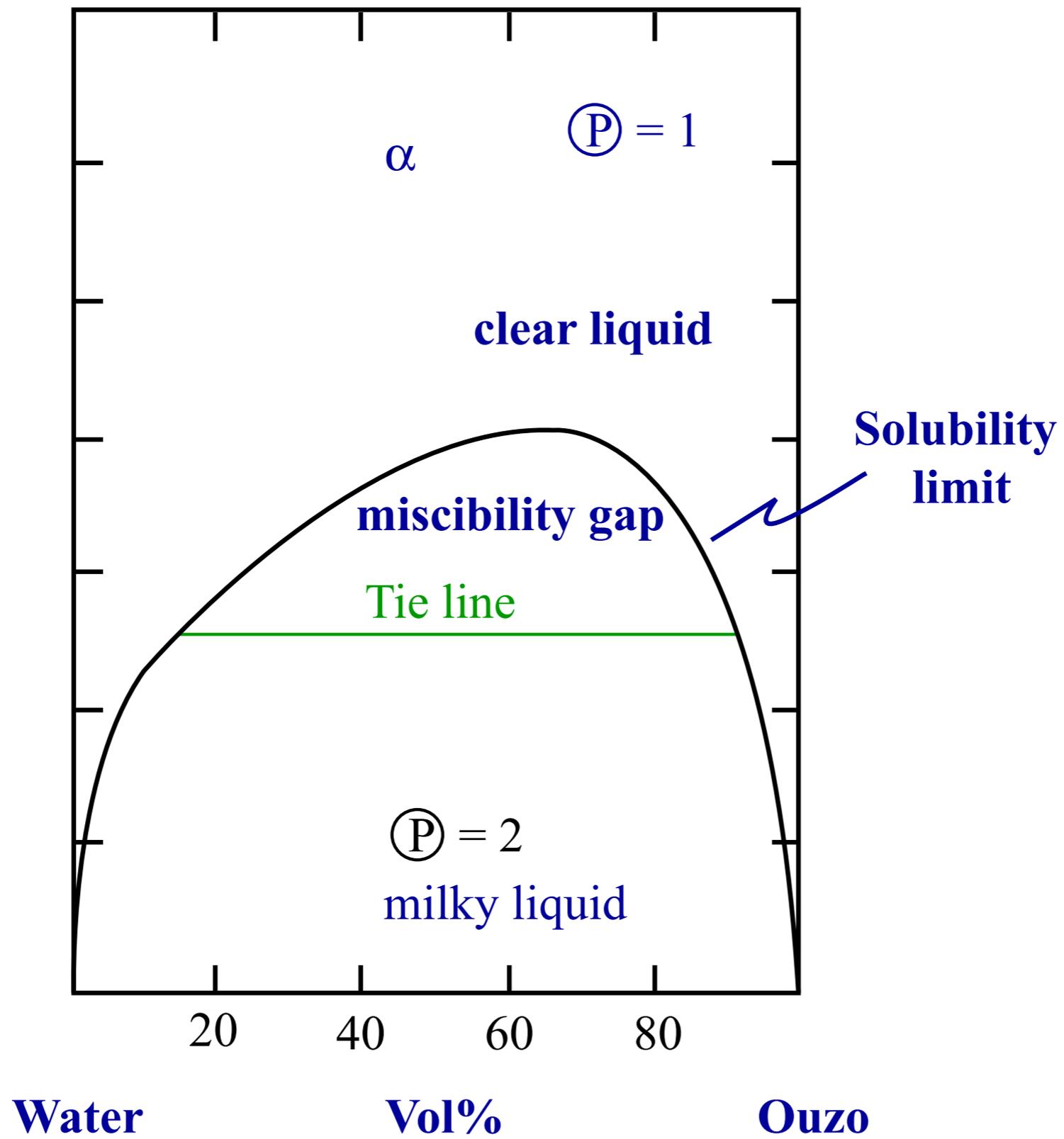
OUZO - water system:

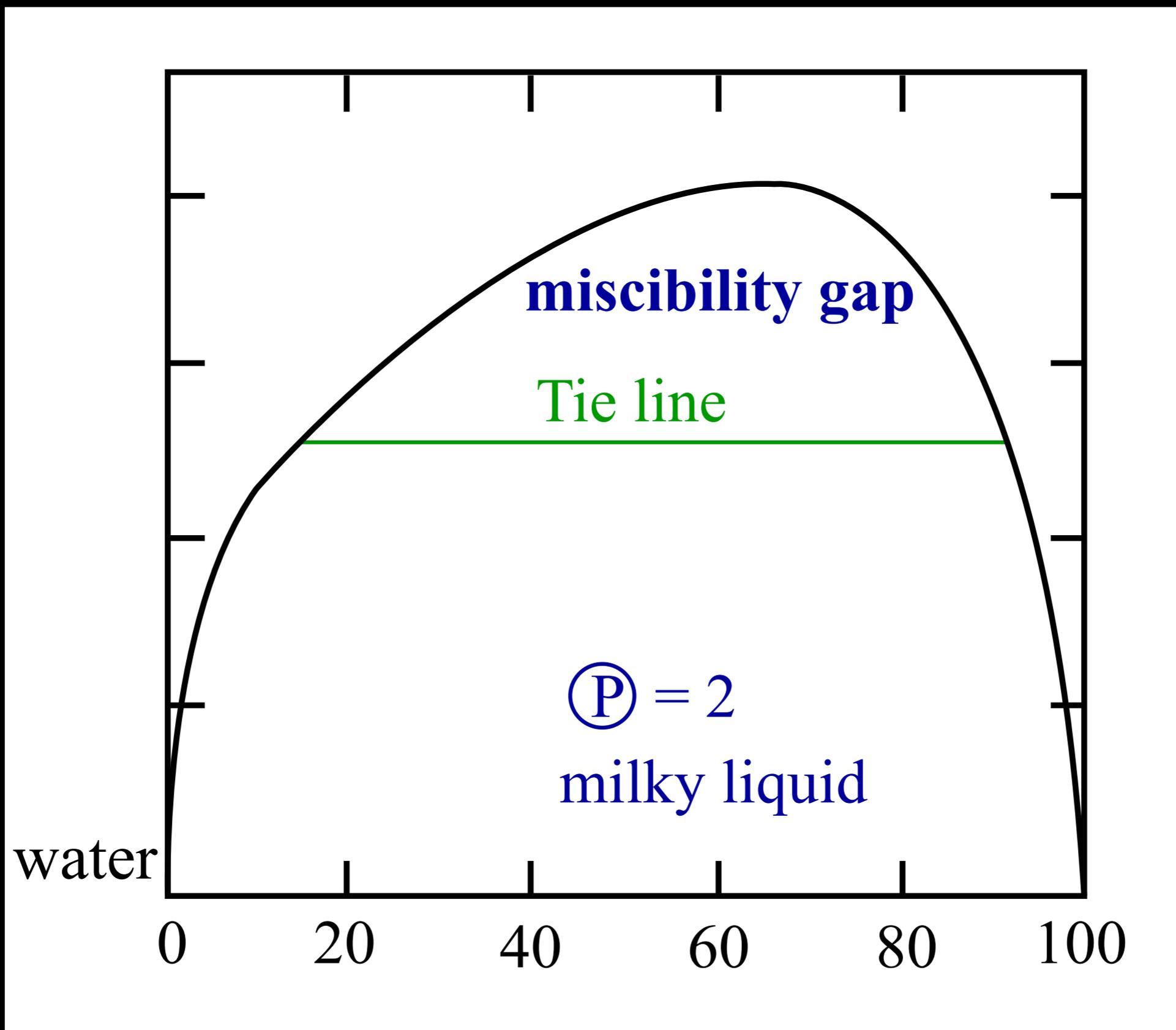
an example of limited solubility

What is *ouzo*?

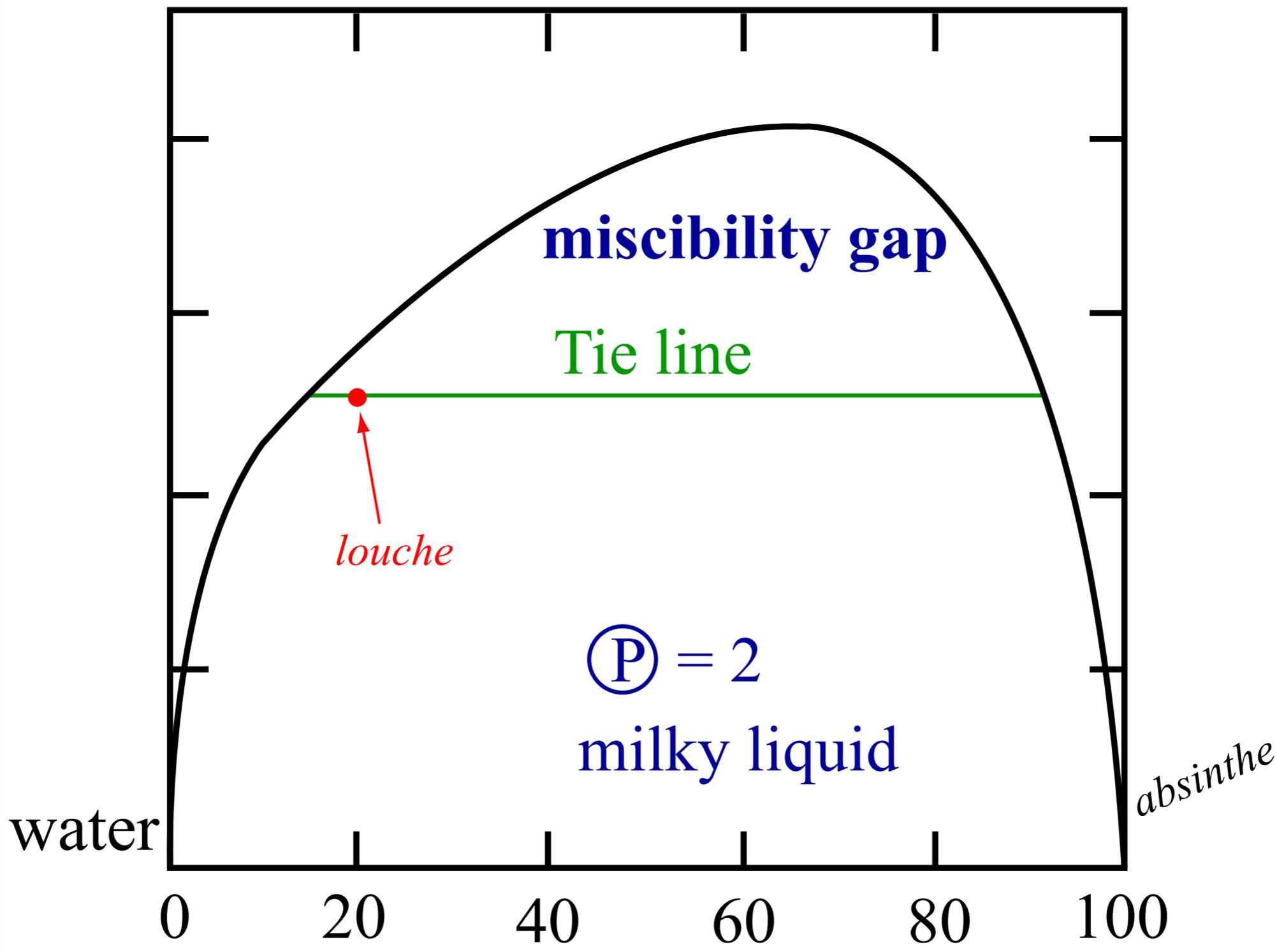
- liquor from the absinthe family
- wormwood is the chief flavoring agent
- also contains licorice, hyssop, fennel, angelica root, aniseed

Ouzo-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)



water

0 20 40 60 80 100

absinthe

miscibility gap

Tie line

louche

$\textcircled{P} = 2$

milky liquid

L'absinthe OXYGÉNÉE

C'est ma santé



MAISON FONDÉE EN 1857 - 10, rue de Valenciennes - PARIS

C. CUSENIER - PARIS

CUSENIER Inventeur

Poster c. 1896



Van Gogh

c. 1887



Picasso

c. 1901



Picasso

Image courtesy of Mark Harden's [Artchive](#).



absinthe



Poster critical of the ban on absinthe in Switzerland, by Albert Gantner, 1910

c. 1910

Image removed due to copyright restrictions.

See Carter, Kelley. "[Absinthe Flows Again, More Stylish Than Ever.](#)"
USA TODAY, 9/27/2007.

15.9994

-218.79

-182.95

1.429

3.44

13.618

[He]2s²p⁴

Oxygen

8

-2

O

“Love is like oxygen.”

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3.091SC Introduction to Solid State Chemistry
Fall 2009

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