

Unit 9 - Week 7: Liquid Mixtures and Fugacity

Course outline

How does an NPTEL online course work?

Week 0: Prerequisite

Week 1: Introduction of Phase Equilibria

Week 2: Estimation of Thermodynamic Properties

Week 3: Potential Energy Functions and Intermolecular Forces

Week 4: Molecular Theory of Corresponding States

Week 5: Intermolecular Interactions and E.o.S

Week 6: Gaseous Mixtures and Fugacity

Week 7: Liquid Mixtures and Fugacity

Lec 1: Liquid Mixtures and Excess Functions

Lec 2: Excess Functions and Activity Coefficients

Lec 3: Activity Coefficients and Thermodynamic Consistency

Quiz : Assessment 7

Weekly feedback form for week 7

Lecture Notes: Week 7

Solution: Assignment 7

Week 8: Models for Activity Coefficients using Excess Gibbs Energy

Week 9: Vapour - Liquid Equilibria of Multicomponent Non-Ideal Systems

Week 10: Liquid - Liquid Equilibria of Multicomponent Non-Ideal Systems

Week 11: Vapour - Liquid - Liquid Equilibria of Multicomponent Non-Ideal Systems

Week 12: Solid - Liquid Equilibria of Non-Ideal Systems

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Assessment 7

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-18, 23:59 IST.

1) For an ideal solution, if reference state is Lewis Randall law, then reference state fugacity is? 4 points

- Pure component fugacity
 Activity
 Mole fraction
 None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Pure component fugacity

2) For an ideal solution, the ratio between the activity and the activity coefficient is equal to? 4 points

- Excess entropy
 Excess Gibbs energy
 Mole fraction
 None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Mole fraction

3) For an ideal solution, if the reference state is Henry's law, then reference state fugacity is? 4 points

- Pure component fugacity
 Activity
 Henry's law constant
 None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Henry's law constant

4) Consider a binary mixture of cyclohexane (1) and dodecane (1) at 39.33°C. If the system can be defined by two suffix Margules equation and if activity coefficients at infinite dilution is $\gamma_1^\infty=0.88$, then what is the value of two suffix Margules parameter, A (J/mol)? 6 points

- 240
 -332
 -428
 -149

No, the answer is incorrect.
Score: 0

Accepted Answers:
-332

5) Consider a binary mixture of cyclohexane (1) and dodecane (1) at 39.33°C. If the system can be defined by two suffix Margules equation and if activity coefficients at infinite dilution is $\gamma_2^\infty=0.86$, then what is the value of two suffix Margules parameter, A (J/mol)? 6 points

- 163
 -392
 -470
 -508

No, the answer is incorrect.
Score: 0

Accepted Answers:
-392

6) Consider an equimolar binary mixture of species "a" and "b". The activity coefficients at infinite dilution are given by: $\gamma_a^\infty=2.0$ and $\gamma_b^\infty=1.5$. Calculate activity coefficient of species "a" and "b" using three suffix Margules equation. Corresponding activity coefficient equations are given below: $RT \ln \gamma_a = (A + 3B)x_b^2 - 4Bx_b^3$ and $RT \ln \gamma_b = (A - 3B)x_a^2 + 4Bx_a^3$. 10 points

- $\gamma_a = 2.41$ and $\gamma_b = 6.12$
 $\gamma_a = 0.11$ and $\gamma_b = 4.92$
 $\gamma_a = 3.41$ and $\gamma_b = 0.52$
 $\gamma_a = 1.11$ and $\gamma_b = 1.19$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\gamma_a = 1.11$ and $\gamma_b = 1.19$

7) Consider an equimolar binary mixture of species "a" and "b". The activity coefficients at infinite dilution are given by: $\gamma_a^\infty=2.0$ and $\gamma_b^\infty=1.5$. Calculate activity coefficient of species "a" and "b" using van Laar equation. Corresponding activity coefficient equations are given below:

$$RT \ln \gamma_a = \frac{A'}{\left(1 + \frac{A' x_a}{B' x_b}\right)^2} \text{ and } RT \ln \gamma_b = \frac{B'}{\left(1 + \frac{B' x_b}{A' x_a}\right)^2}$$

- $\gamma_a = 2.41$ and $\gamma_b = 6.12$
 $\gamma_a = 0.11$ and $\gamma_b = 4.92$
 $\gamma_a = 3.41$ and $\gamma_b = 0.52$
 $\gamma_a = 1.10$ and $\gamma_b = 1.18$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\gamma_a = 1.10$ and $\gamma_b = 1.18$