

Chapter 9.

1. :

1)

(solution)

2)

(solvent)

(solute)

가

(aqueous solution)

2.

1) (%) ()

$$\text{wt\%} = \frac{\text{mass of solute}}{\text{mass of solution}} \times 100$$

$$\text{vol\%} = \frac{\text{volume of solute}}{\text{volume of solution}} \times 100$$

2) (ppm : parts per million)

$$\text{ppm} = \frac{\text{mass of solute}}{\text{mass of solution}} \times 10^6$$

3) (Molarity)

1L

, M

mol/L

$$M = \frac{\text{moles of solute}}{\text{volume of solution (L)}}$$

4) (Molality)

1kg

m

.

$$m = \frac{\quad}{\text{kg}}$$

5) (Mole Fraction)

$$X_i = \frac{\quad / \quad (\quad)}{(\quad)}$$

9.1	28% NH_4Cl	250g	NH_4Cl	가?

9.2	0.030M KMnO_4	50mL	,	mmol	KMnO_4	g
	KMnO_4 가	가? (KMnO_4	:	158g/mol)		

9.3	1.2kg	60g	KCl	.
	(KCl	:	74.6g/mol)	

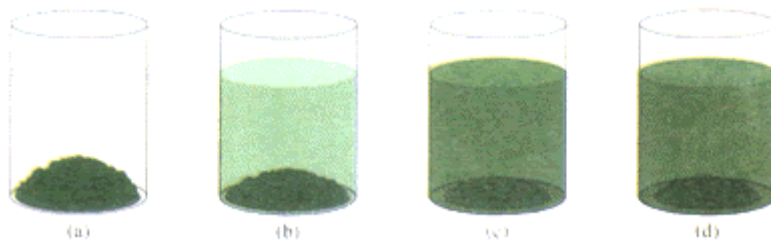
3.

1)

(Solubility)

- a.
- b.
- c.
- d.

2)



가

3)

100g

g

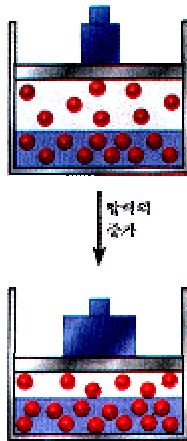
가

가 가 ,

4.

1)

가 () ,
가 가
가 .



2)

: Henry

()

$$C = K_H \cdot P$$

C :

K_H : Henry

P :

9.4	0	4atm	CO ₂	25	CO ₂
가 $4 \times 10^{-4} \text{atm}$ CO ₂					
, $K_H(0) = 7.7 \times 10^{-2} \text{ mol/L.atm}$, $K_H(25) = 3.2 \times 10^{-2} \text{ mol/L.atm}$					

(Colligative Property)

가 . Raoult

$$P^{\circ}:$$

 $K_b :$

$$\Delta T_f = K_f \cdot m$$

ΔT_f :

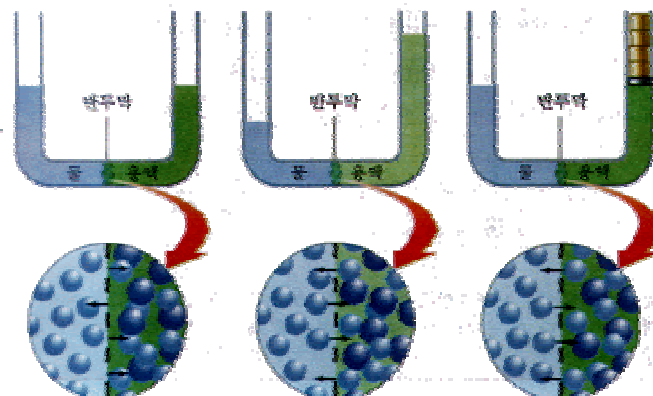
m :

K_f :

9.6	(C ₂ H ₅ OH) 15g	(HCOOH) 750g	7.2
		8.4	K_f (
	: 46.0 g/mol)		

9.7	1.2g	50.0g	4.92
		5.48	K_f 5.12 /m

4) (Osmosis)



: 10^{-6}m
 .
 : 가
 ,
 :
 가
 , (van't Hoff, 1887)

$$\pi = cRT = \left(\frac{n}{V}\right)RT$$

π : (atm) c :
 n : V : (L)
 R : (0.082 L.atm/mol.K) T :

9.8			1.50g	0.25L	.
	277K	0.00342atm			가?

5)

$$\Delta T_f = i \cdot K_f \cdot m$$

$$\Delta T_b = i \cdot K_b \cdot m$$

$$\pi = i \cdot cRT$$

i : van't Hoff (factor) () 1

) : $i = 1$, NaCl : $i = 2$, CaCl₂ : $i = 3$

9.1 (C₅H₁₂) 17.0% (C₂H₄) 가? (C₅H₁₂=72g/mol, C₂H₄=28g/mol)

9.2 5.3% 가? (NH₃=17g/mol)

9.3 0.1093M KMnO₄ 15.0mL 50.0mL . 가?

9.4 0.50M HCl 5.0mL 0.20M HCl 15.0mL 25.0mL가 . HCl
M 가?

9.5 Br₂ 25 300torr . 50.0g CCl₄ Br₂ Br₂
72.0torr . Br₂ 가? (Br₂=160g/mol, CCl₄=154g/mol)

9.6 () 2.05% 25 93.90torr . 25
95.18torr . 가? (=78.0g/mol)

9.7 50.0g 1.25g 0.085 . (K_f(H₂O)=1.86 /m, K_b(H₂O)=0.51 /m)

a) 가? b) 가?

9.8 가 0.973g/mL 5.00m (CH₃OH) . a) , b) , c)
. (CH₃OH=32g/mol)

9.9 CH₃OH 2.00% (C₆H₁₂O₆) 5.00%

가? ($\text{CH}_3\text{OH}=32\text{g/mol}$, $\text{C}_6\text{H}_{12}\text{O}_6=180\text{g/mol}$, $K_f(\text{H}_2\text{O})=1.86 \text{ } / m$)

9.10

a) 15% NaCl 200g

b) 0.250m (C_{10}H_8) (C_6H_6) 500g

c) 0.150M ($\text{C}_2\text{H}_6\text{O}_2$) 25.0mL

d) 0.05824M $\text{CuSO}_4 \cdot 6\text{H}_2\text{O}$ 500mL

9.11

0.21atm 25

$3.2 \times 10^{-4}\text{M}$

1.00atm O_2

가?

9.1

- a) 8.5% 100g KNO_3
- b) 8.50mol% $(\text{C}_3\text{H}_6\text{O})$ 300g
- c) 1000g 0.0375m LiClO_4
- d) $3.6 \times 10^{-4}\text{M}$ 75.0L O_2

9.2 0.02M BaCl_2 7.0mL 0.04M HCl 3.0mL 가 가 50.0mL
 Ba^{2+} Cl^-

- a) BaCl_2 가?
- b) Cl^- 가?

9.3 (CH_3OH) 25 129torr $(\text{C}_2\text{H}_5\text{OH})$ 63torr

- a) 32.0% 25 가?
- b) 가?

9.4 50 1536torr n- 49.4torr n-
 47.8 mol% 50 가?

9.5 85.0 433.6torr 6.00% ()
 428.3torr 가?

9.6 10.0g α - 1.00g 1.22 α -
가? ($K_b(\text{C}_6\text{H}_6)=2.53 \text{ } / m$)

9.7 50mg 10mL 25 4.8torr .
.

- -

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9.1 0.345

9.2 $3.3m$

9.3 0.0328M

9.4 0.22M

9.5 16.4g

9.6 120.19g/mol

9.7 a) 150g/mol b) -0.31

9.8 a) 13.8 wt% b) 0.0826 c) 4.19M

9.9 -1.81

9.10

9.11 $1.52 \times 10^{-3}M$

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9.1 a) 8.5g b) 231g c) 3.99g d) 0.86g

9.2 a) 0.0028M b) 0.0080M

9.3 a) 38torr b) 90torr

9.4 0.966

9.5 93g/mol

9.6 207g/mol

9.7 $1.93 \times 10^4g/mol$