

9. SOLUTIONS

Learning Objectives

After studying this lesson, students will be able to

- ❖ Define solution.
- ❖ Recognize the types of solutions.
- ❖ Analyze the factors influencing solubility.
- ❖ Explain the various modes of expression of concentration of solution.
- ❖ Calculate the solubility of solutes in solvents.
- ❖ Correlate the hydrated salts and anhydrous salts.
- ❖ Distinguish between deliquescent and hygroscopic substances

Important Notes and Results

- ⊞ The effect of pressure on the solubility of a gas in liquid is given by **Henry's law**. It states that, the solubility of a gas in a liquid is directly proportional to the pressure of the gas over the solution at a definite temperature.

⊞

Hygroscopic substances	Deliquescence substances
When exposed to the atmosphere at ordinary temperature, they absorb moisture and do not dissolve.	When exposed to the atmospheric air at ordinary temperature, they absorb moisture and dissolve.
Hygroscopic substances do not change its physical state on exposure to air.	Deliquescent substances change its physical state on exposure to air.
Hygroscopic substances may be amorphous solids or liquids.	Deliquescent substances are crystalline solids.

☐ Hydrated salts

Common Name	IUPAC Name	Molecular Formula
Blue Vitriol	Copper (II) sulphate pentahydrate	$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
Epsom Salt	Magnesium sulphate heptahydrate	$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
Gypsum	Calcium sulphate dihydrate	$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
Green Vitriol	Iron (II) sulphate heptahydrate	$\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$
White Vitriol	Zinc sulphate heptahydrate	$\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$

☐ Solubility's of some common substances in water at 25°C

Name of the solute	Formula of the solute	Solubility g/100 g water
Calcium carbonate	$\text{CaCO}_3(\text{s})$	0.0013
Sodium chloride	$\text{NaCl}(\text{s})$	36
Ammonia	$\text{NH}_3(\text{g})$	48
Sodium hydroxide	$\text{NaOH}(\text{s})$	80
Glucose	$\text{C}_6\text{H}_{12}\text{O}_6(\text{s})$	91
Sodium bromide	$\text{NaBr}(\text{s})$	95
Sodium iodide	$\text{NaI}(\text{s})$	184