

don't
need

Post Lab 1: Physical Presentation and Solubility

Dena Sarraji

CHEM 3418

Identification of Aldehydes and Ketones: Physical Presentation and Solubility Analysis

←⁻⁵ Substances may dissolve in other substances to form clear solutions or may fail to dissolve resulting in a precipitate. The dissolving substance is known as the solute while the other one is the solvent. This phenomenon is known as solubility, and it primarily depends on the physical and chemical properties of the solute and solvents as well as pH, pressure, and temperature of the solution. Analysis of solubility patterns in different solvents can be used to identify unknown solids and liquids. This is because the unknown substances will follow a specific solubility pattern in different solvents; they are soluble in some solvents but insoluble in others. Intermolecular forces (IMFs) between the molecules of solutes and those of solvents determine the solubility of substances. The greater the intermolecular forces, the greater the solubility of the solute in the solvent. Polar solutes dissolve in polar solvents while nonpolar solutes dissolve in non-polar solvents. Based on this theoretical framework, two unknown substances were put in different solvents to analyze their solubility patterns and therefore help predict their identity. The substances were solid 7A and liquid 7B. The solvents used were water, sodium hydroxide, hydrochloric acid, and sulfuric acid.

Results and Discussion

←⁻⁵ The solubility of the solid 7A in the various solvents was as presented in the table below. The unknown solid was insoluble in all the solvents except sulfuric acid.

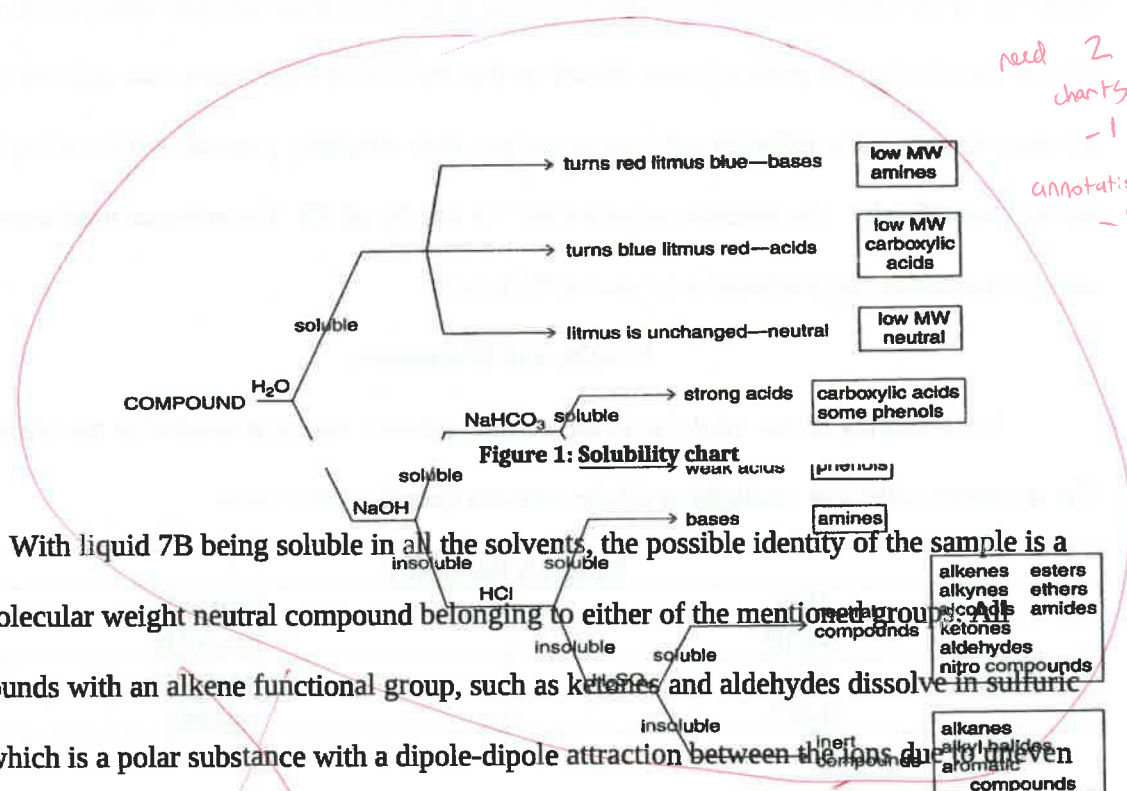
no table

Solid 7A Solubility	
H ₂ O	Insoluble
NaOH	Insoluble
HCl	Insoluble
H ₂ SO ₄	soluble

The solubility test results for liquid 7B were as displayed in the table below. The liquid was soluble in all the solvents.

Liquid 7B solubility Results	
H ₂ O	Soluble
NaOH	Soluble
HCl	Soluble
H ₂ SO ₄	Soluble

Solubility of the two unknowns were tested using water, sodium hydroxide, hydrochloric acid, and sulfuric acid. Solid 7A was only soluble in sulfuric acid while liquid 7B was soluble in all the solvents. Since both test samples dissolved in sulfuric acid, their possible identity was ketones, aldehydes, alkenes, alcohols, alkynes, or nitro compounds in reference to the solubility chart below.



PHYSICAL PRESENTATION AND SOLUIBILITY

4

double bond. They also have dispersion forces but no hydrogen bonding. Like dissolves like, so both compounds may be polar.

References

Properties of Aldehydes and Ketones. (n.d.). *Chemistry Libre texts* .

<https://chem.libretexts.org/?>

[`title=Bookshelves/Organic\_Chemistry/Supplemental\_Modules\_\(Organic\_Chemistry\)`](https://chem.libretexts.org/?title=Bookshelves/Organic_Chemistry/Supplemental_Modules_(Organic_Chemistry))

[`/Aldehydes\_and\_Ketones/Properties\_of\_Aldehydes\_`](https://chem.libretexts.org/?title=Bookshelves/Organic_Chemistry/Supplemental_Modules_(Organic_Chemistry)/Aldehydes_and_Ketones/Properties_of_Aldehydes_)

[`%26\_Ketones/Properties\_of\_Aldehydes\_and\_Ketones`](https://chem.libretexts.org/?title=Bookshelves/Organic_Chemistry/Supplemental_Modules_(Organic_Chemistry)/Aldehydes_and_Ketones/Properties_of_Aldehydes_and_Ketones)