DETERMINATION OF SOLUBILITY CLASS

Experiment :6

prepared by :

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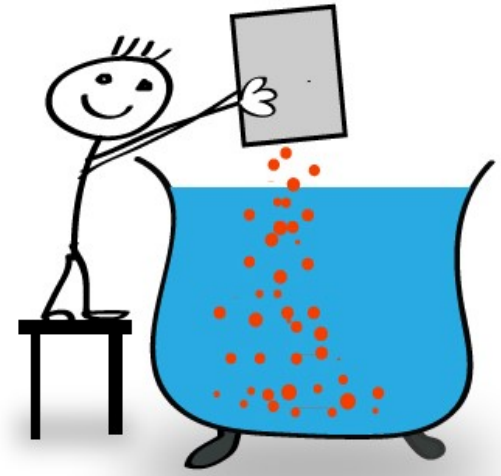
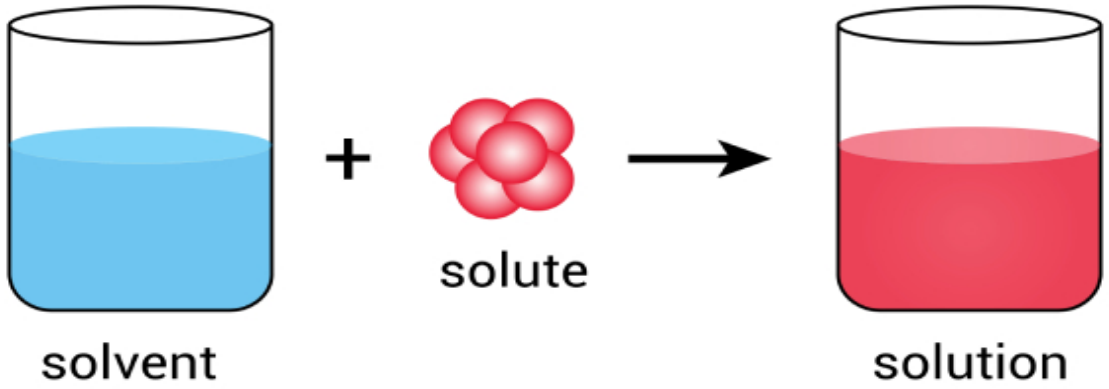


Introduction

Solubility = the max amount of solute that can be dissolved in a solvent.

- Solubility class determination gives an idea about the type of the functional group present in the compound, the polarity and molecular weight of the compound, and the nature of the compound (acidic, basic, neutral).



Introduction

This is accomplished by testing the solubility of the compound in either of the following sets of solvents:

1- Distilled water solution.
2- Ether
3- 5% NaOH solution.
4- 5% $NaHCO_3$ solution.
5- 5% HCl solution.
6- cold concentrated H_2SO_4.

Water

is a polar solvent. It has the ability to form hydrogen bonding . If the compound is water soluble, the next step is to test its solubility in ether.

Introduction

Ether:

is a non-polar solvent , it differs from water in that it cannot dissolve ionic compounds such as salts Note that solubility in ether is tested only for water-soluble compounds.

5% NaOH & 5% $NaHCO_3$:

5% NaOH solution reacts with water insoluble compounds that are capable of donating protons such as strong and weak acids and it is called a detecting solvent.

5% $NaHCO_3$ solution is called a a sub classifying solvent since it can react with strong acids only. That is, these two solvents give an idea about the acidity degree of the compound.

Introduction

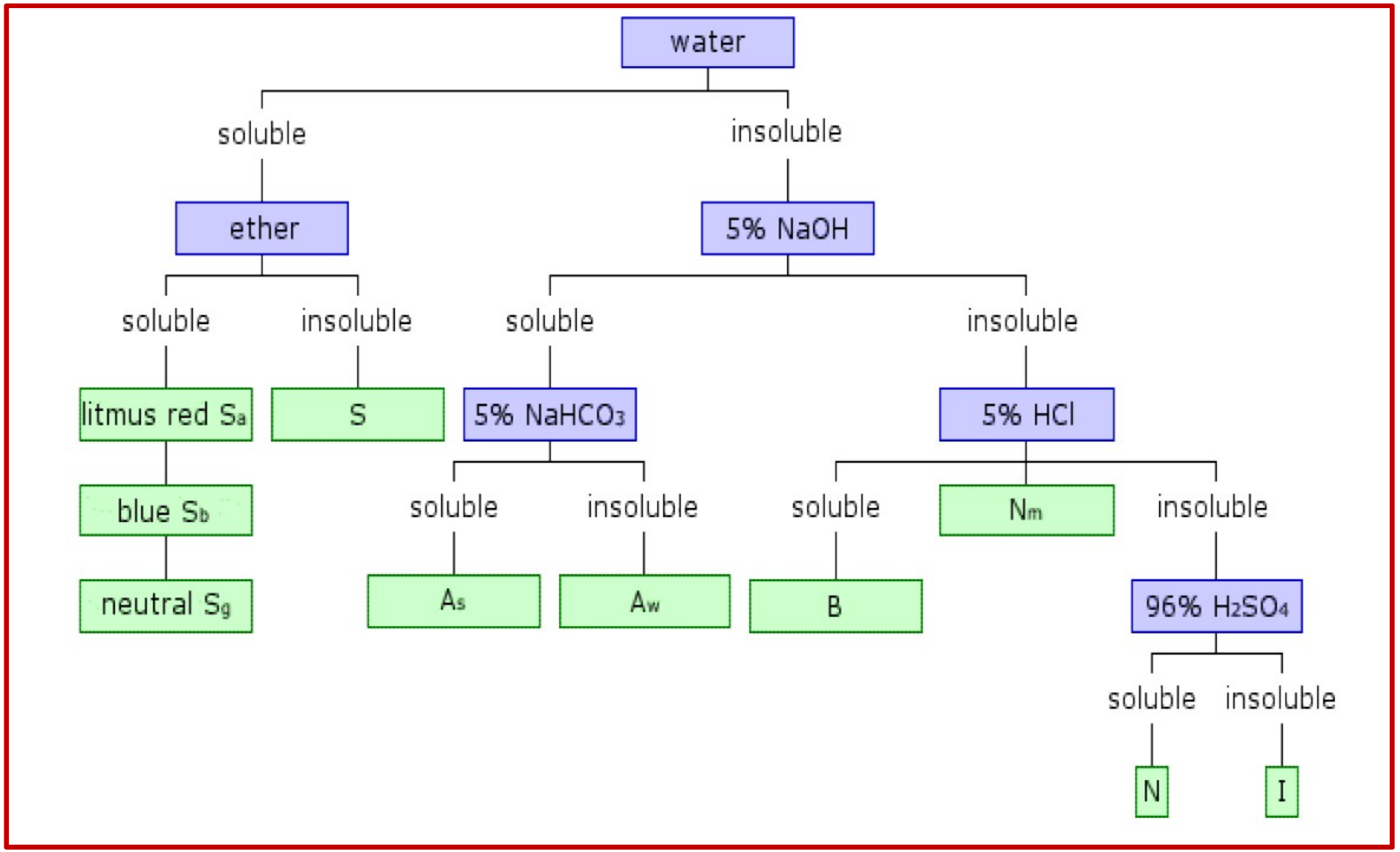
HCl 5%

If the compound is insoluble in water and NaOH solution (and, hence, insoluble in $NaHCO_3$ too), this means that the compound is not an acid but, rather, is either a basic compound or a neutral compound. 5% HCl solution, which can dissolve basic compounds.

Cold concentrated H_2SO_4

If the compound is insoluble in water, NaOH, and HCl solution, solubility in cold con. H_2SO_4 should be tested. If the compound is soluble in this acid that means includes neutral compounds such as aldehydes, ketones,

Introduction



Introduction

Class	Functional Group Possibilities
Sa	carboxylic acids (high MW).
Sb	amines (Low MW)
Sg	alcohols, aldehydes, ketones (Low MW)
S	salts of organic acids, amine hydrochlorides.
As	carboxylic acids (high MW)
Aw	phenols, thiophenols (high MW)
B	aliphatic amines (high MW)
Nm	neutral compounds containing N or S
N	alcohols, aldehydes, ketones (high MW)
I	alkanes, alkenes alkayl halides (Low or high MW)


Let's Start
Experimenting