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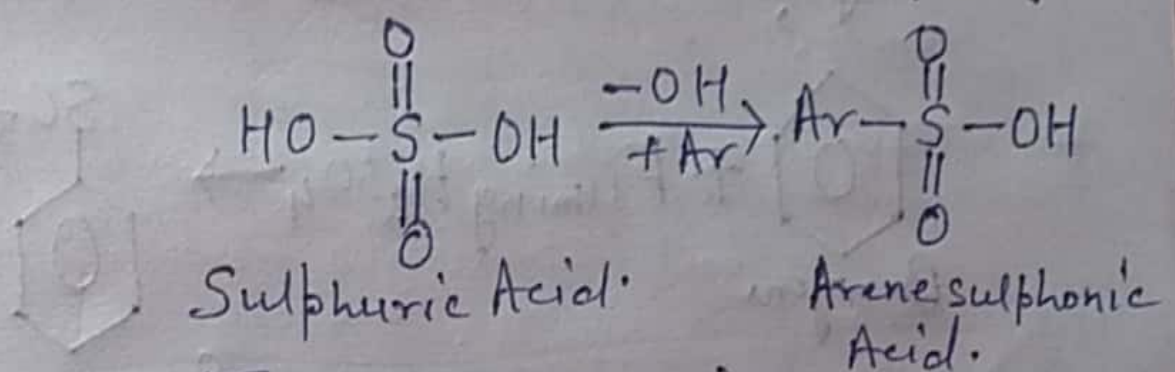
Date: 28.07.20

B.Sc. Part II (Hons.)
Organic Chemistry
Paper: III C.

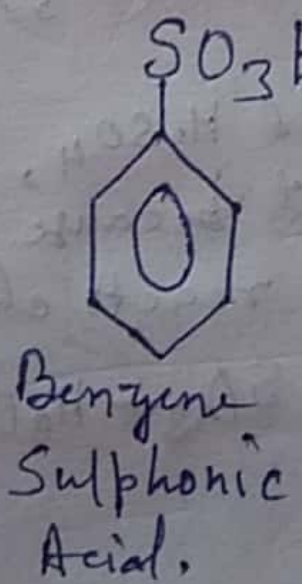
Topic: Benzene Sulphonic acid

- By Dr. Manju Kumari

The functional gr. in this class of compounds is the Sulphonic acid or Sulpho gr.



The name of an individual member is derived by appending the suffix - sulphonic acid to the parent Arene.

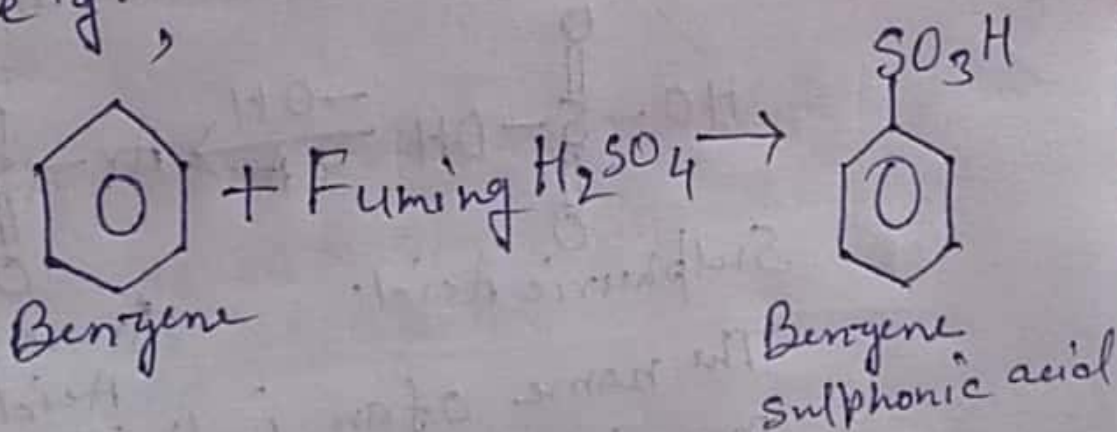


METHODS OF PREPARATION

Benzene reacts with fuming sulphuric acid at room temp. to give sulphonic acids.

Sulphonation can also be carried with concentrated sulphuric acid alone. Such reactions are slow and heating is generally required.

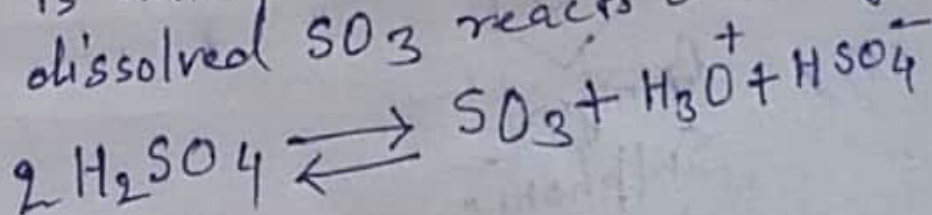
e.g.,



MECHANISM:

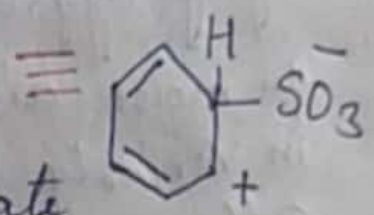
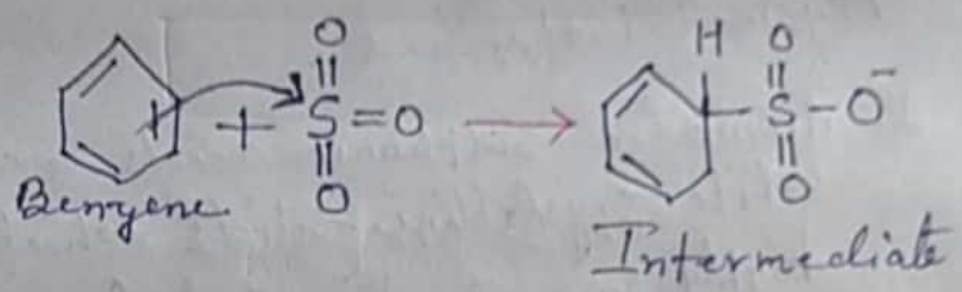
Step 1. Electrophile is formed. Sulphur trioxide (SO_3) is electrophile.

In concentrated H_2SO_4 , this step is unimportant because the dissolved SO_3 reacts directly.

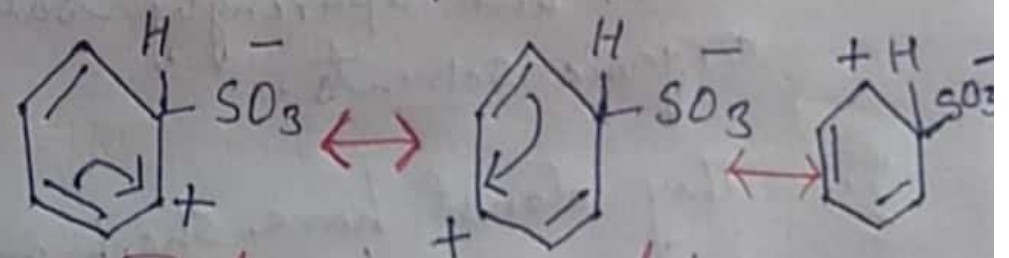


3.

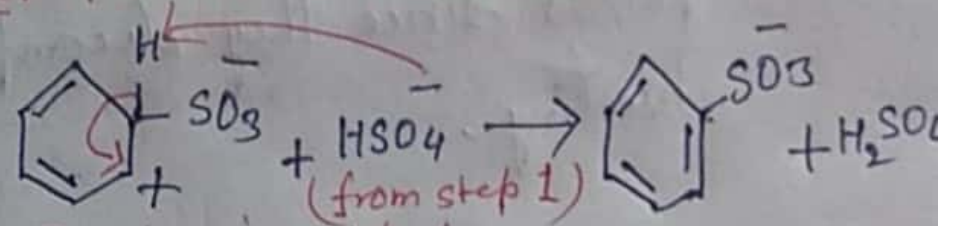
Step 2. Electrophile attacks the benzene ring to give a carbonium ion.



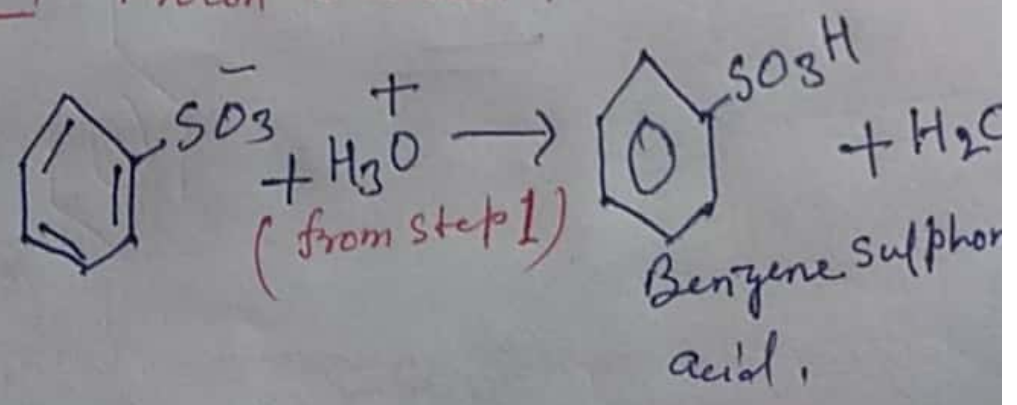
The intermediate carbonium ion is resonance-stabilised. It is a hybrid of the following structures:



Step 3. Proton is removed:



Step 4. Proton is added:



Properties

Physical Properties :

1. Aromatic Sulphonic acids are white crystalline solids which are highly hygroscopic and form syrups in moist air. That is why they are in variably used in the form of their salts.

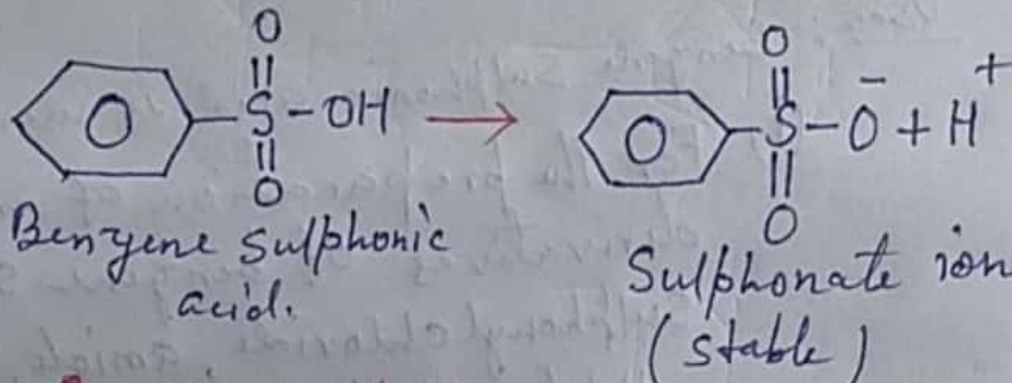
2. They are extremely soluble in water but sparingly soluble in organic solvents.

3. They do not have sharp melting points since they decompose on heating.

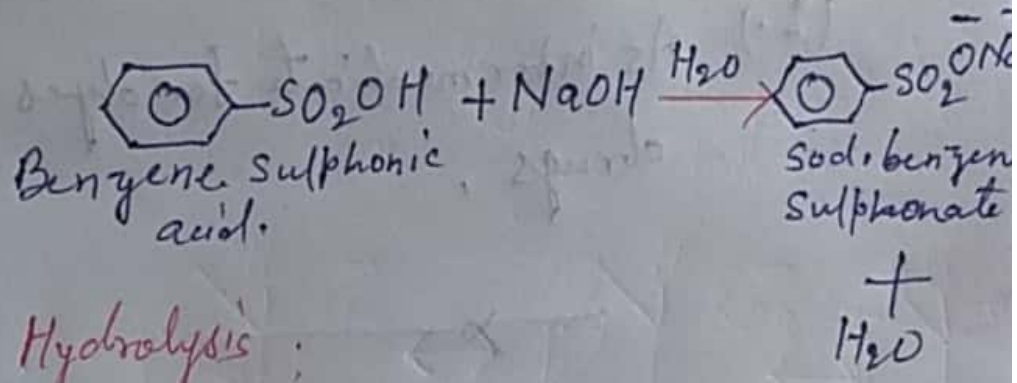
5.

Chemical Properties:

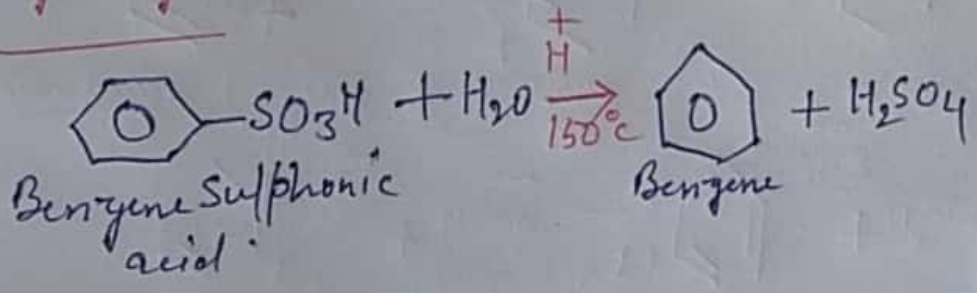
Sulphonic acids are strong acids and are completely ionised in solution.



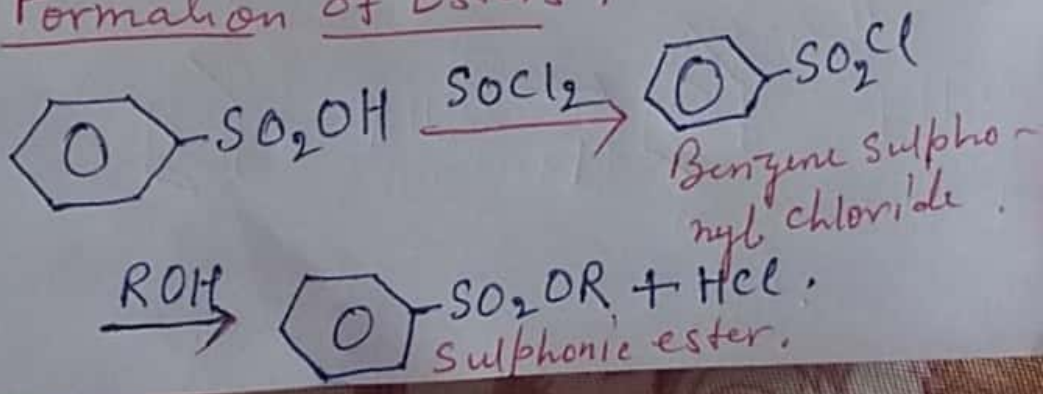
Reactions with Bases to form Salts:



Hydrolysis:



Formation of Esters:



Uses: Benzene Sulphonic acid is used;

(1) For the preparation of many derivatives of benzene such as Sulphonyl chloride, amide, esters, thiol, etc.

(2) As intermediate for dyes and drugs.

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