الفرقة الأولى عملى كيمياء عامة

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Chemical Analysis

- **Qualitative**
  - Investigation ?
  - e.g.: Acidic & Basic Radical of Inorganic salts
  - $Na^{\oplus} Cl^{\ominus}$
- **Quantitative** (1 — (1–4))
  - Concentration ?
  - Volumetric (Titration)
  - Gravimetric
  - Spectrophotometric

Acidic Radical ($Cl^{\ominus}$) (Anions)

(1) Dilute HCl Group
(2) Conc. H_2SO_4 Group
(3) Miscellaneous Group

Solid + Dil. HCl
OR Solid + Conc. H_2SO_4

Basic Radical ($Na^{\oplus}$) (Cations)

$K^{\oplus}$, Mg^{2+}, Al^{3+}, Fe^{2+}, Fe^{3+}, ...

Dil. Acid (~0.2 M)

solid salt (~0.2 g)

Test Tube

(1) Dil. HCl Group

- Carbonate, CO_3^{2-} ; Bicarbonate, HCO_3^-
- Sulphide, S^{--} — Na_2S , $Fe^{II}S$
- Sulphite, SO_3^{2-} — Na_2SO_3
- Thiosulphate, $S_2O_3^{2-}$ — $Na_2S_2O_3$
- Nitrite, NO_2^- — $NaNO_2$

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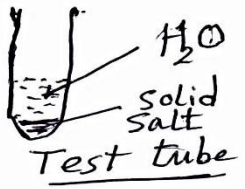
(P. 20 – 26) ; (P. 27, as Example)

Example : CO_3^{2-}

Physical Properties

- Solubility: soluble in H_2O - OR Insoluble in ----, but soluble in --- (Dil. HCl , Δ, ---)
- Colour : white , yellow, ----
- Shape : powder , amorphous or crystals
- Effect on Litmus paper: — Changes Litmus paper into blue (∴ salt has basic properties)
  — Changes Litmus paper into Red (∴ salt has acidic properties)



Chemical properties

Experiment	Observation	Results
1- Solid + dil. HCl	effervescence and evalution of a gas turbids Lime H_2O	--- CO_2 --- $CaCO_3$
2- Soln + $MgSO_4$	White ppt. on Cold	$MgCO_3$

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3- Soln + $HgCl_2$	Reddish ppt. on cold	$Hg_2(OH)_2CO_3$
4- Soln + $AgNO_3$	White ppt. "	Ag_2CO_3
in Distilled H_2O		

∴ Acidic Radical is CO^{2-} 3

Note: *① If salt soluble in H_2O ---- the salt is CO_3^{2-} OR HCO_3^-, so we carry out Confirmatory tests

- If ppts. formed on Cold → ∴ salt is CO_3^{2-}
- If ppts. formed after Heating → ∴ salt is HCO_3^-

*② Iff salt insoluble in H_2O ∴ salt is CO_3^{2-}
& NO Confirmatory tests carried out.
(only Basic Experiment (①) is done)

(2) Conc. H_2SO_4 Group

- Chloride, Cl^- – Bromide, Br^- – Iodide, I^- – Nitrite, NO_2^-

(P.33 — P.36) ; (P.37) as Example)

(3) Miscellaneous Group

- Sulphate, SO_4^{2-} — Phosphate, PO_4^{3-}
- Borate, $B_4O_7^{2-}$.

(P. 41 — 42) ; (P. 43, as Example)

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*- Student should :

(1)- Know Chemical formula of Inorganic salt.

(2)- Know Chemical Equations of all Reactions

(3)- Remmeber the observations for Basic Experiment (Solid + Dil. HCl or Conc. H_2SO_4), So to Carry out the suitable confirmatory tests for the UnKnown salt provided.

(4) - Use Net: You Tube

↳ Qualitative Chemical Analysis for Anions.

(There is: [01-10-2016 في 6 دقائق
8-10-2016 في 7 دقائق]
Are Useful

Exercise:

(1) Show the Effect of adding Conc. H_2SO_4 on salts of (a) KI (b) $NaNO_2$ with Writting Chemical Equations.

(2) Complete: (i) $2NaHCO_3 + MgSO_4 \longrightarrow$ --- + --- $\xrightarrow{\Delta}$ ---

(ii) $2KCl + \text{Conc. } H_2SO_4 \xrightarrow{\Delta}$ --- + - $\xrightarrow[\Delta]{+ MnO_2}$ ---

(iii) $Ca(OH)_2 + CO_2 \longrightarrow$ ---

(Lime water)

(Please see Pages enclosed)