

CHEMISTRY REPORTS

By: M.Y

Report 1: (CO_3^{2-})

physical properties:

1. color: white
2. shape: powder
3. solubility: soluble in cold water

chemical properties:

experiment	observation	Result
principal Test solid salt + dil. HCl	strong eff. with evolution of colorless gas.	It may be CO_3^{2-} or HCO_3^-
confirmatory Tests:		
1) salt sol. + MgSO_4	white ppt. on cold	It's CO_3^{2-}
2) salt sol. + BaCl_2	white ppt. on cold	It's CO_3^{2-}
3) salt sol. + AgNO_3	white ppt. turns into brown ppt. by heating	It's CO_3^{2-}

* The acidic radical is CO_3^{2-}

Report 2: $(S_2O_3^{2-})$

physical prop.:

1-Color: colorless

2- shape: crystalline

3- solubility: soluble in cold water

1:00 chemical prop.:
2:00

experiment	observation	Result
3:00 4:00 5:00 principal Test solid salt + dil. Hcl	yellowish-white ppt. after shaking	It may be $S_2O_3^{2-}$
6:00 7:00 8:00 Confirmatory Tests 1) salt sol + I_2	Disappearance of brown color of I_2	It's $S_2O_3^{2-}$
9:00 10:00 2) salt sol + $AgNO_3$	white ppt. turns into yellow → orange → brown → black ppt.	It's $S_2O_3^{2-}$
3-) salt sol + $FeCl_3$	Dark violet color disappears on shaking or by excess of $FeCl_3$	It's $S_2O_3^{2-}$
4-) salt sol + $(CH_3COO)_2Pb$	white ppt. after shaking turns into black ppt. by heating	It's $S_2O_3^{2-}$
5. salt sol + dil. H_2SO_4 + KNO_3	Disappearance of violet color of KNO_3	It's $S_2O_3^{2-}$

* The acidic radical is $S_2O_3^{2-}$

Report 3: (Cl^-)

physical prop.:

1. color: white
2. shape: crystalline
3. Solubility: Soluble in cold water

chemical prop:

experiment	observation	Result
principle test of 1 st group Solid salt + dil. HCl.	-ve	It's not in 1 st group
principle Test Solid salt + conc. H_2SO_4	strong eff. with evolution of colorless gas give white clouds NH_4OH moistened paper	It may be Cl^-
confirmatory tests		
1) Salt soln + $AgNO_3$	white ppt. soluble in NH_4OH and turns into Violet in direct sunlight.	It's Cl^-
2) Salt soln + $(CH_3COO)_2Pb$	white ppt. after shaking and dissolves in boiling water	It's Cl^-

* The acidic radical is Cl^-

Report 4: (SO_4^{2-})

physical prop:

- 1- color: colorless
- 2- shape: crystalline
- 3- solubility: soluble in cold water

Chemical prop:

exp.	obs.	Result
principle test of 1 st group solid salt + dil. HCl	-Ve	1 st group is absent
2 nd) solid salt + ~~conc.~~ conc. H_2SO_4	-Ve	2 nd group is absent
conc. salt soln + BaCl_2	white ppt. insoluble in HCl	It may be SO_4^{2-}
Confirmatory tests:		
1- Salt sol. + AgNO_3	pale white ppt. increases by heating	It's SO_4^{2-}
2- Salt sol + $(\text{CH}_3\text{COO})_2\text{Pb}$	white ppt. soluble in hot H_2SO_4	It's SO_4^{2-}

* the acidic radical is SO_4^{2-}

Report 5: (PO_4^{3-})

physical prop:

1. color: white
2. shape: crystalline
3. Solubility: Soluble in cold water

chemical prop:

exp.	obs.	Result
principle tests:		
1st) solid salt + dil. HCl	-ve	1 st gb is absent
2nd) solid salt + conc. H_2SO_4	-ve	2 nd gb is absent
Conc. salt soln + BaCl_2	White ppt. soluble in dil. HCl	It may be PO_4^{3-} or $\text{B}_4\text{O}_7^{2-}$
Confirmatory tests:		
1-) Conc. salt soln + AgNO_3	Yellow ppt. soluble in dil. HNO_3 and NH_4OH	It's PO_4^{3-}
2-) salt soln + FeCl_3	Yellowish white ppt. soluble in dil. HCl	It's PO_4^{3-}

* the acidic Radical is PO_4^{3-}

Report: 6: ((Cu^{+2}))

physical prop:

1-color: blue

2-shape: Solution

3-Miscibility: Miscible in cold water

chemical prop:

exp.	obs.	Result
principle test of 1 st gp: Salt sol + dil. HCl	-ve	1 st gp is absent
Salt sol + dil. HCl + H_2S (XXS)	Black ppt.	It may be Cu^{+2}
Confirmatory tests: Salt sol + NaOH	Blue ppt.	It's Cu^{+2}
Salt sol + NH_4OH	Greenish ppt. soluble in (XXS) NH_4OH → intense blue sol.	It's Cu^{+2}
Salt sol + $\text{K}_4[\text{Fe}(\text{CN})_6]$	Reddish brown ppt.	It's Cu^{+2}
Salt sol + NH_4SCN	Black ppt., while NH_4SCN sol is greenish sol.	It's Cu^{+2}

* the Basic Radical is Cu^{+2}

Report: 7:

 (Cd^{+2})

physical prop:

1. Color: Colorless
2. Shape: Solution
3. Miscibility: Miscible in cold water

chemical prop:

exp.	obs.	Result
principle tests of 1 st gp: salt sol + dil. HCl	-ve	1 st gb is absent
salt sol + dil. HCl + H_2S (xrs)	canary yellow ppt.	It may be Cd^{+2}
confirmatory tests: salt sol + NaOH	white ppt.	It's Cd^{+2}
salt sol + NH_4OH	white ppt.	It's Cd^{+2}
salt sol + $K_4[Fe(CN)_6]$	white ppt.	It's Cd^{+2}

*) the Basic Radical is Cd^{+2}

Report 8: (Fe^{+3})

physical prop:

1000
1-color: Yellow

2 shape: solution

3- Miscibility: Miscible in cold water

1-00 chemical prop:

Time	exp	obs.	Result
3:00			
4:00	principle tests of 1 st gp:		
5:00	Salt sol + dil HCl	-ve	1 st gb is absent
6:00	2 nd Salt sol + dil HCl + H ₂ S (x x s)	-ve	2 nd gb is absent
7:00			
8:00	3 rd Salt sol + NH ₄ Cl + NH ₄ OH (solid, x x s) (few)	Reddish-brown gel ppt. soluble in dil HCl.	It may be Fe ⁺³ .
9:00			
10:00	Confirmatory tests:		
	1-) Salt soln + NaOH (few)	Reddish brown gel. ppt. soluble in dil. HCl	It's Fe ⁺³
	2-) Salt sol + NH ₄ OH + H ₂ S (few) (x x s)	Black ppt. soluble in dil. HCl	It's Fe ⁺³
	3-) salt sol + K ₄ [Fe(CN) ₆] (few)	Dark blue insoluble in dil. HCl	It's Fe ⁺³
	4-) salt sol + NH ₄ SCN (few)	Deep (blood) Red	It's Fe ⁺³
	5-) salt sol + NH ₄ OH + Na ₂ HPO ₄ (few) (x x s)	pale Yellow (Yellowish-white) ppt. soluble in dil. HCl	It's Fe ⁺³

* the Basic Radical is Fe^{+3}

physical prop:

1. color: Green
2. shape: Solution
3. Miscibility: Miscible with cold water

chemical prop:

exp.

obs.

Result

principle tests of:

1) salt sol + dil. HCl

-ve

1st gb is absent

2) salt sol + dil. HCl + H_2S (xss)

-ve

2nd gb is absent

3) salt sol + NH_4Cl + NH_4OH (solid, xss) (few)

-ve

3rd gb is absent

4) salt sol + NH_4Cl + NH_4OH + H_2S (solid, xss) (few) (xss)

Black ppt. Soluble in hot conc. HNO_3 or aqua regia

It may be Ni^{+2} or Co^{+2}

confirmatory tests:

1) salt sol + $NaOH$ (few)

Greenish ppt. insoluble in $NaOH$ but Soluble in NH_4OH → blue sol

It's Ni^{+2}

2) salt sol + NH_4OH (few)

Greenish ppt. Soluble in NH_4OH (xss) forming blue sol

It's Ni^{+2}

3) salt sol + NH_4OH + NaH_2PO_4 (few) (xss)

Greenish ppt. Soluble in NH_4OH (xss) or dil. acids

It's Ni^{+2}

4) salt sol + $K_3[Fe(CN)_6]$ (few)

Yellow ppt.

It's Ni^{+2}

5) salt sol + DMG + NH_4OH (few drops)

Red ppt.

It's Ni^{+2}

* the Basic Radical is ~~the~~ Ni^{+2}

Report 10: (Ba^{+2})

Physical prop:

1-color: colorless

2-shape: crystalline

3-solubility: Soluble in cold water

Chemical prop:

exp.	obs.	Result
principle tests:		
1 st) salt sol + dil. HCl	-Ve	1 st gb is absent
2 nd) salt sol + dil. HCl + H_2S (XXS)	-Ve	2 nd gb is absent
3 rd) salt sol + NH_4Cl + NH_4OH (solid, XXS) (few)	-Ve	3 rd gb is absent
4 th) salt sol + NH_4Cl + NH_4OH + H_2S (solid, XXS) (few) (XXS)	-Ve	4 th gb is absent

exp.	obs.	Result
principle test of 5^{th} gb: ~~con~~ Conc. salt sol + NH_4Cl (xxs) + NH_4OH (few) + $(NH_4)_2CO_3$ (xxs)	White ppt. Soluble in dil. acids	It may be Ba^{+2} or Ca^{+2} or Sr^{+2}
confirmatory tests:		
1-) Conc. salt sol + $CaSO_4$	Heavy white ppt. Soluble in acids.	It's Ba^{+2}
2-) Conc. salt sol + K_2CrO_4	Yellow ppt. insoluble in acetic acid	It's Ba^{+2}
3-) Conc. salt sol + NH_4OH (few) + Na_2HPO_4 (xxs)	White ppt. soluble in dil. HCl	It's Ba^{+2}
4-) Conc. salt sol + NH_4OH (few) + $(NH_4)_2C_2O_4$ and warming	White ppt. soluble in dil. HCl	It's Ba^{+2}
5-) Conc. salt sol + $K_2Cr_2O_7$	Yellow ppt	It's Ba^{+2}
6-) Flame test	Apple green colored flame	It's Ba^{+2}

* The Basic Radical is Ba^{+2}

Report 11 : $((NH_4)^+)$

physical prop:

1. color: off white
2. shape: crystalline
3. solubility: soluble in cold water

chemical prop:

exp.	obs.	Result
principle tests:		
1 st) salt sol + dil. HCl	-ve	1 st gb is absent
2 nd) salt sol + dil. HCl + H_2S (XXS)	-ve	2 nd gb is absent
3 rd) salt sol + NH_4Cl + NH_4OH (Solid, XXS) (few)	-ve	3 rd gb is absent
4 th) salt sol + NH_4Cl + NH_4OH + H_2S (solid, XXS) (few) (XXS)	-ve	4 th gb is absent
5 th) conc. salt sol + NH_4Cl (XXS) + NH_4OH + $(NH_4)_2CO_3$ (XXS) (few)	-ve	5 th gb is absent

1-) salt sol + NaOH and heating	odor of NH_3 is evolved which gives white clouds with HCl moistened paper.	It may be $(NH_4)^+$
2-) salt sol + Na_2CO_3 and heating	odor of NH_3 is evolved	It's $(NH_4)^+$
3-) salt sol + $Na_2[Co(NO_2)_6]$	Yellow ppt.	It's $(NH_4)^+$

* the Basic Radical is $(NH_4)^+$