



MEGA LECTURE

TEST TUBE REACTIONS FOR TOPIC 6

1) Halogen Displacement Reactions

	Chloride	Bromide	iodide
Chlorine		Yellow/Orange solution (orange in cyclohexane) $\text{Cl}_2 + 2\text{Br}^- \rightarrow \text{Br}_2 + 2\text{Cl}^-$	Yellow/Brown solution (purple in cyclohexane) $\text{Cl}_2 + 2\text{I}^- \rightarrow \text{I}_2 + 2\text{Cl}^-$
Bromine	Yellow/Orange solution (orange in cyclohexane) No reaction		Yellow/Brown solution (purple in cyclohexane) $\text{Br}_2 + 2\text{I}^- \rightarrow \text{I}_2 + 2\text{Br}^-$
Iodine	Yellow/Brown solution (purple in cyclohexane) No reaction	Yellow/Brown solution (purple in cyclohexane) No reaction	

The more reactive halogen (ie the halogen with more oxidising power) is always reduced
The more reactive halide (ie the halide with more reducing power) is always oxidised

2) Group 2 Precipitation Reactions

Solution	Observation on adding H_2SO_4	conclusion	Ionic equation
MgCl_2	No visible reaction	MgSO_4 is soluble	
CaCl_2	No visible reaction	CaSO_4 is soluble	
SrCl_2	Faint white precipitate	SrSO_4 is only slightly soluble	$\text{Sr}^{2+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) \rightarrow \text{SrSO}_4(\text{s})$
BaCl_2	Thick white precipitate	BaSO_4 is insoluble	$\text{Ba}^{2+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) \rightarrow \text{BaSO}_4(\text{s})$

Conclusion: The solubility of Group 2 sulfates decreases down the group

Solution	Observation on adding NaOH	conclusion	Ionic equation
MgCl_2	Thick white precipitate	$\text{Mg}(\text{OH})_2$ is insoluble	$\text{Mg}^{2+}(\text{aq}) + 2\text{OH}^-(\text{aq}) \rightarrow \text{Mg}(\text{OH})_2(\text{s})$
CaCl_2	Faint white precipitate	$\text{Ca}(\text{OH})_2$ is only slightly soluble	$\text{Ca}^{2+}(\text{aq}) + 2\text{OH}^-(\text{aq}) \rightarrow \text{Ca}(\text{OH})_2(\text{s})$
SrCl_2	No visible reaction	$\text{Sr}(\text{OH})_2$ is soluble	
BaCl_2	No visible reaction	$\text{Ba}(\text{OH})_2$ is soluble	

Conclusion: Solubility of Group 2 hydroxides increases down the group

3) Group 7 Precipitation Reactions

Halide ion	Observation on adding AgNO ₃ (aq)	Observation on adding NH ₃
F ⁻	No precipitate	
Cl ⁻	White precipitate $\text{Ag}^+(\text{aq}) + \text{Cl}^-(\text{aq}) \rightarrow \text{AgCl}(\text{s})$	Precipitate dissolves in dilute NH ₃
Br ⁻	Cream precipitate $\text{Ag}^+(\text{aq}) + \text{Br}^-(\text{aq}) \rightarrow \text{AgBr}(\text{s})$	Precipitate dissolves in concentrated NH ₃ but not dilute NH ₃
I ⁻	Yellow Precipitate $\text{Ag}^+(\text{aq}) + \text{I}^-(\text{aq}) \rightarrow \text{AgI}(\text{s})$	Precipitate insoluble in NH ₃