

Dojo Study Club

Combined Chemistry WA2 Revision Guide

Definitions

Exothermic Reaction	A reaction in which heat (energy) is given out to the surroundings.	
Endothermic Reaction	A reaction in which heat (energy) is absorbed by the surroundings.	

Redox	
ποαολ	

Redox Reaction	A reaction in which both reduction and oxidation take place.
Oxidation	A substance in oxidised when it gains oxygen in a chemical reaction.
Reduction	A substance is reduced when it loses oxygen in a chemical reaction.
Oxidising Agent	A substance that causes another reactant to go through oxidation, while undergoing reduction themselves.
Reducing Agent	A substance that causes another reactant to go through reduction, while undergoing oxidation themselves.





Rate Of Reaction

The speed at which reactants are converted into products, per unit time

Concentration

(aqueous solutions)

Higher concentration, more particles per unit volume, higher frequency of efficient collisions.

Temperature

(all)

Higher temperature, particles move faster with more energy, higher frequency of efficient collisions

Pressure

(gases)

Higher pressure, particles closer to one another, higher frequency of efficient collisions

Surface Area

(solids)

Smaller particles, larger surface area, higher frequency of efficient collisions

Catalyst

(all)

Provides alternate pathway of lower activation energy, increases rate of reaction without being chemically changed



Cation Table

		Sodium hydroxide solution, NaOH(aq)		Aqueous ammonia, NH ₃ (aq)	
	Cation	On adding a few drops	On adding excess	On adding a few drops	On adding excess
	Zn ²⁺	White precipitate	Precipitate dissolves	White precipitate	Precipitate dissolves
			in excess to form a		in excess to form a
			colourless solution		colourless solution
☆	Aβ+	White precipitate	Precipitate dissolves	White precipitate	Precipitate is
			in excess to form a		insoluble in excess
			colourless solution		
ক্ষ	Pb ²⁺	White precipitate	Precipitate dissolves	White precipitate	Precipitate is
			in excess to form a		insoluble in excess
			colourless solution		
	Ca ²⁺	White precipitate	Precipitate is	No precipitate	No precipitate
			insoluble in excess		
	Cu ²⁺	Light blue	Precipitate is	Light blue	Precipitate dissolves
		precipitate	insoluble in excess	precipitate	in excess to form a
					deep blue solution
	Fe ²⁺	Green precipitate	Precipitate is	Green precipitate	Precipitate is
			insoluble in excess		insoluble in excess
	Fe ³⁺	Reddish-brown	Precipitate is	Reddish-brown	Precipitate is
		precipitate	insoluble in excess	precipitate	insoluble in excess
	NH_4^+	No precipitate.	No change is		
		On heating,	observed		
		ammonia gas is given			
		off and the gas turns			
		moist red litmus			
		paper blue.			

How to differentiate between AI and Pb

The observations with NaOH(aq) and NH3 (aq) are the same for Al3+ and Pb2+ ions

- Add Potassium lodide (KI) to both solutions.
- A yellow precipitate (Pbl2) is formed for Pb, while no precipitate formed for Al



Anion Table

Anion	Test	Observations for positive test and inference
CO32-	Add dilute hydrochloric acid.	Effervescence is observed.
	Pass the gas that is given off into	Gas given off forms a white precipitate
	limewater.	with limewater. Carbon dioxide gas is
		given off.
NO ₃ ⁻	Add sodium hydroxide solution, then add a	Effervescence is observed.
	piece of aluminium foil. Warm the mixture.	
	Test the gas given off with moist red	The moist red litmus paper turns blue.
	litmus paper.	Ammonia gas is given off.
SO42-	Add dilute nitric acid, then add barium	A white precipitate of barium sulfate is
	nitrate solution.	formed.
CF	Add dilute nitric acid, then add silver	A white precipitate of silver chloride is
_	nitrate solution.	formed.
I-	Add dilute nitric acid, then add silver	A yellow precipitate of silver iodide is
	nitrate solution.	formed.

Sulfates, Chlorides and Iodides require Dilute Nitric Acids - Why?

- To remove carbonates and hydroxide ions!
- If dilute nitric acid is not added, precipitates of BaCO3, Ag2CO3 and AgOH will form when barium nitrate / silver nitrate is added, which will interfere with the results.



Gas Table

	Gas	Test	Observations
	Oxygen	Insert a glowing splint into the	The glowing splint is rekindled.
		test tube.	
SSS	Hydrogen	Place a lighted splint at the mouth	The lighted splint is extinguished with a
ourle		of the test tube.	'pop sound'.
рО	Carbon dioxide	Bubble gas through limewater.	White precipitate is formed in the
			limewater. The precipitate dissolves
			upon further bubbling.
	Chlorine	Place a piece of moist blue litmus	The moist blue litmus paper turns red,
	(Greenish yellow)	paper at the mouth of the test	and is then bleached.
		tube.	
	Sulfur dioxide	Place a piece of filter paper	The purple acidified potassium
gent		soaked with acidified potassium	manganate (VII) turns colourless.
Bung		manganate (VII) at the mouth of	
		the test tube.	
	Ammonia	Place a piece of moist red litmus	The moist red litmus paper turns blue.
		paper at the mouth of the test	
		tube.	