Electrolysis

Guidlines	Metal Purification
Non-metal at anode	Thin pure Metal at cathode
metal at cathode	Thick impure metal at anode
If halogen present -> anode	Electrolyte soluble salt of metal
Cathode -> least reactive *metal*	
OH^- at anode -> *$4OH^-$ --> $2H2O + O2 + 4e^-$*	

Metals

Iron Extraction

raw materials: coke(C), Hot air, Limestone(CaCo3)

1. C + O2 --> CO2
2. CaCO3 --> Cao + Co2
3. CO2 + C --> 2CO
4. Fe2O3 + 3CO --> 2Fe + 3CO2 (*700 celcius*)
5. CaO + SiO2 --> CaSiO3(slag)

Acid, Bases and salts

Neutralization Reaction

Acid + Base --> Salts + Water

$H^+(aq) + OH^-(aq)$ --> H2O(lq)

Rules

- All Nitrates are soluble
- all sodium, potassium, ammonium salts are soluble
- all chlorides are soluble except *lead* and *silver*
- all sulfates are soluble except *Barium, calcium ,lead*
- all carbonates and hydroxides are insoluble

Methods

acid + metal --> salt + hydrogen (*MAZIT* metal)

acid + carbonate--> Salt + water + carbon Dioxide

Titration: acid + alkali --> salt + water (reactive metals)

acid + *insoluble* base --> salt + water(unreactive metals)

Precipitation(insoluble): *Soluble* salt + *Soluble* salt --> *insoluble* salt + *soluble salt*

- example: Barium Chloride + SOdium Sulfate --> sodium chloride + barium sulfate

Organic Chemistry

All Organic Compounds

Combustion: organic compund + oxygen --> carbon dioxide + water

Organic Chemistry (cont)

Alkanes

Substitution Reaction: Alkane + Chlorine --> Chloroalkane + Hydrogen (

-example :CH4 + Cl2 --> CH3Cl + HCl

Cracking: long alkane --> shorter alkane + alkene

-example: C12H26 --> C10H22 + C2H4

Thermal Cracking: Catalyst- Broken Unglazed Pottery

Catalytic cracking: 550 degree cel and chromium oxide catalyst

Alkenes

Hydrogenation: alkene + hydrogen --> alkane (200^{deg}, nickel)

Hydration: alkene + steam --> alcohol (300^{deg}, 6000^{kPa}, Phospheric(V)

halogenation(alkene Test): alkene + bromine --> diobromoalkene (brow

Alchohol

Oxidation: ethanol + oxygen --> ethanoic acid + water (Pottasium Mang

Fermentation: glucose --> ethanol + carbon dioxide(yeast)

Carboxylic Acid

ehtanoic acid + sodium hydroxide --> sodium ethenoate + water

CH3COOH + NaOH --> CH3COONa + H2O

ethanoic acid + mangnesium --> magnesium ethanoate + hydrogen

2CH3COOH + Mg --> (CH3COOH)2Mg + H2O

ethanoic acid + sodium carbonate --> sodium ethanoate + carbon dioxi

2CH3COOH + Na2CO3 --> 2CH3COONa + CO2 + H2O

Chemical Reactions

Haber Process	Contact Process
N2 + 3H2 <--> 2NH3	2SO2 + O2 <--> 2SO3
Conditions:	*Conditions:*
- 20000 kPa	- 200 kPa
- 450 celcius	- 450 celcius
- Iron catalyst	- Vanadium(V)oxide

Chemistry Of the enviornment

Test For Water

- anhydrous copper(II)sulfate turns form *white* to *blue*
- Cobalt(II) Chloride Paper turns from *blue* to *pink*
- impure water has higher boiling point

Catalytic Converter

2NO + 2CO --> N2 + CO2