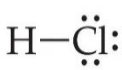
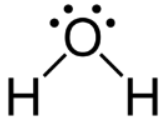
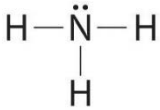
MEMORIZE US for the Chemistry Regents Exam / Last Minute Desperate Review

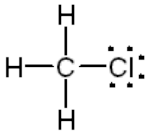
some Lewis Dot Diagrams that you should have memorized:

Polar Molecules



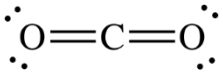


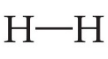


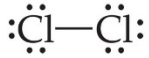


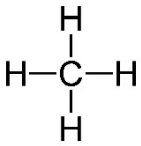
CH_3Cl (why is it polar unlike CH_4?)

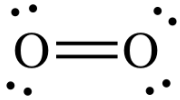
Nonpolar Molecules











N_2 = classic triple bond O_2 = classic double

*** nonpolar molecule = **not**-lopsided (in terms of e- distribution) = has more than 1 axis of symmetry

4 Reaction Types:

- Single Replacement
- Double Replacement
- Synthesis
- Decomposition

7 Organic Reaction Types:

- Addition
- Substitution
- Combustion
- Fermentation
- Saponification
- Polymerization
- Esterification

pH Scale

- **0** *acids* **7** *bases* **14** *(7 = neutral = pure H_2O)*
- **H+ is the same as H_3O+** (hydronium ion; listed on Table E) = acids put these into solution
- OH- (hydroxide ion, listed on Table E) = bases put these into solution
- Arrhenius acids & bases = just explains plain old H+ (H_3O+) and OH-
- ***Alternate*** Acid-Base Theory = acids are H+ (proton) **donors**, bases are H+ (proton) **acceptors**
- Go down pH by 1 hop = 10x MORE H+ (down 3 hops = 10x10x10 = 1000x more H+)
- Go up pH by 1 hop = 1/10 as much H+ (10x more OH-)

Isotope Notation: C-14 = carbon-14 = mass number 14 *(all C has 6 protons = atomic #)*

Solution = a homogenous mixture (*solvent* = liquid *solute* = dissolved solid)

At Equilibrium… …the fwd & reverse **rxn rates** are equal
…the **concentrations** stay **constant** but can be different from each other

Le Chatelier's Principle: *if you stress (mess with) a rxn, it goes AWAY from an addition, TOWARDS a gap, treat heat like any other react/prod, **squeezing** (higher Pressure) favors toward side with **fewer** moles of **gas***

Bonding

- **Ionic:** Metal /Nonmetal, valence e- **transferred**, Lewis dot diagram uses **brackets** like: $[Na]^{+1}$
  - brittle as solids, high MPs, DO NOT conduct as solids but do conduct when molten
  - ***Names:*** metal first then nonmetal, use roman numeral only if metal has multiple charge options
- **Covalent**: nonmetal/nonmetal, valence e- **shared**, Lewis diagram like: H:H (covalent = "molecular")
  - soft, lower MPs, never conduct ever

*** a metal bonded to a polyatomic (like $MgCO_3$) has **ionic & covalent** bonds

- **Metallic**: metals only, valence e- in a "sea" of mobile e
  - Malleable, conduct as solids or molten

IMFs & Properties *(IMFs are between molecules, not within a molecule)*

- strong IMFs cause high MP and BP, weak IMFs cause lower MP & BP
- vapor pressure is OPPOSITE: weak IMFs = HIGH VP (in liquid the particles don't hold tight)
- *weakest IMFs* = Van der Waals (***nonpolar*** molecules like N_2, CO_2) – no reason to stick
- *medium IMFs* = dipole-dipole (***polar*** molecules like HCl, SO_2) – stick b/c + and – ends
- *strongest IMFs* = hydrogen bonding (any molecule with ET FON Home)
- (ionic bonding is stronger than IMFs of anything covalent)

Conductivity

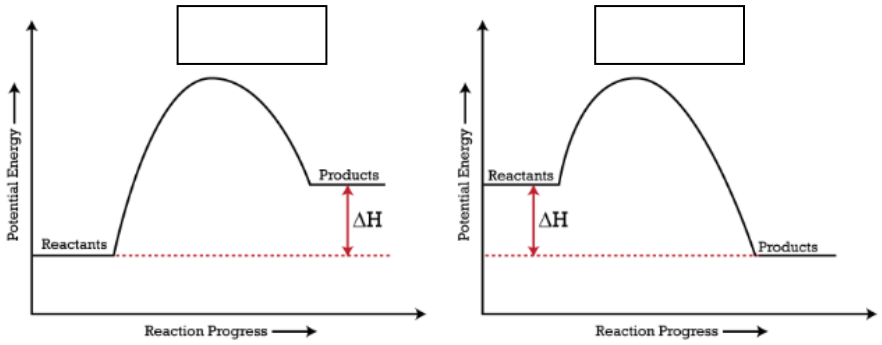
- For solutions, the solute must dissolve to produce **MOBILE IONS**
- For liquids, only melted ionic materials conduct b/c **MOBILE IONS**
- For **metals**, conductivity is because of the **sea of mobile e-**

Regions of the Periodic Table – METALS / NONMETALS / METALLOIDS hate Al-Po dog food

- Group 1 = Alkali (one word for Group 1)
- Group 2 = Alkaline Earth (two words for Group 2)
- Group 17 = Halogens
- Group 18 = Noble Gases
- HOFBrInCl (or 7-up) = diatomics (H_2, N_2, etc.)
- Use Table S to determine what phase at what temp

Endothermic & Exothermic and PE Diagrams

- PE Diagrams: ***endo = "end up"***
- Table I has ΔH hint (+ or -)
- EXO: feels warm, heat is product heat "exits" the system
- ENDO: feels cold, heat is reactant heat "enters" the system
- *(heat of rxn)* **ΔH = PEP – PER**
- activation nrg = from start to peak
- catalyst: decreases the hill (less activation nrg needed)



REDOX

- "reduction" = reduction of charge (goes down)
- LEO says GER An Ox **Big** Red Cat
- *Voltaic Cell* is a battery, chem nrg → electr. nrg, cathode is positive (cations), anode is negative
- *Electrolytic Cell:* electrical nrg →chem. nrg, (use for electroplating, electrolysis)
  - needs source of electricity (like a battery), Table J flipped, cathode is negative

Gases: Write **P T V** on edge of paper for relationship see-saw. If P,T,V are same, so are # moles (molecules).

Organic: (has **carbon**), **saturated** = all single bonds, pasta principle for carbon chains (longer=stronger IMFs)