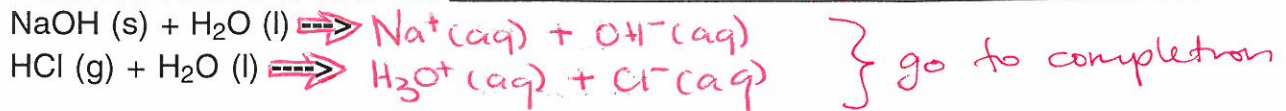


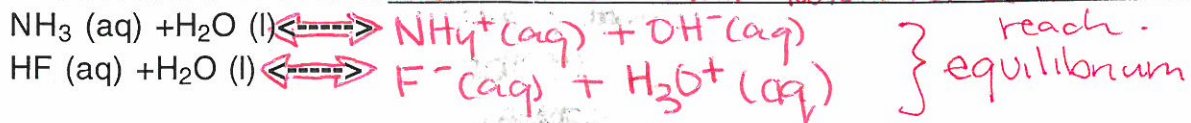
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CHEMISTRY 12
ACID BASES UNIT
Lesson #6
"STRONG AND WEAK" ACIDS AND BASES

STRONG ACIDS or BASES: are 100% ionized in solution.



WEAK ACIDS or BASES are LESS THAN 100% ionized in solution



IMPT:

1. EQUILIBRIUMS involve ONLY Weak acids/bases, NOT STRONG !!!!!

2. IN PRACTICE weak acids and bases are less than 50% ionized.

3. IN CHEMISTRY 12 it is important to get the following terms straight:

STRONG + WEAK- refer to the percentage of ionization of a substance

DILUTE + CONCENTRATED- refer to the molarity of a solution.

NOW LETS EXAMINE THE:

"Relative Strengths of Bronsted-Lowry Acids and Bases" Table.

STRONG ACIDS:

Notice the ONE-WAY ARROWS, that is because STRONG acids do NOT reach equilibrium!!!

Any STRONG ACID in water can be represented by the equation:



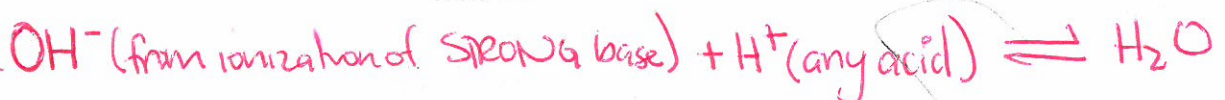
STRONG BASES:

Any STRONG BASE in water can be represented by the equation:

IMPORTANT: The most common strong bases are metal hydroxides (although they do not directly get mentioned on this table) you should be familiar with the following:



WEAK ACIDS: appear on the LEFT side of the table. OH^- and NH_3 NEVER ACT as ACIDS in aqueous solutions!

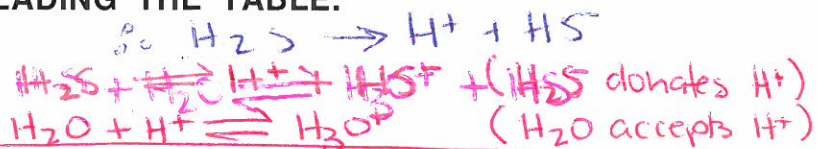


WEAK BASES: appear on the RIGHT side of the table, the top six species (ClO_4^- to HSO_4^-) NEVER act as BASES in aqueous solutions!

A SPECIAL NOTE READING THE TABLE:

ex $\text{H}_2\text{S} \rightleftharpoons \text{H}^+ + \text{HS}^-$

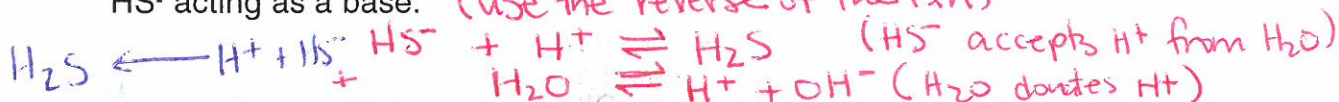
H_2S acting as an acid:



* overall rxn: $\text{H}_2\text{S} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{HS}^-$ *

When a substance acts as an ACID with water, H_3O^+ is ALWAYS PRODUCED!!!

HS^- acting as a base: (use the reverse of the rxn)

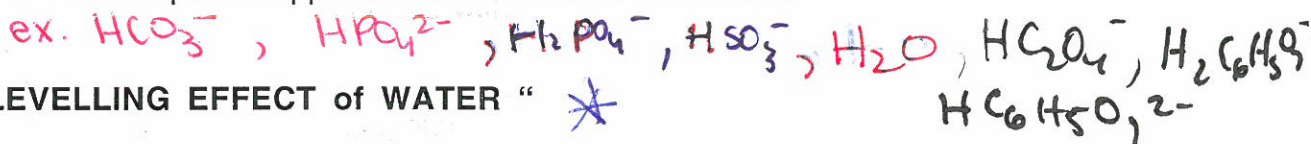


overall rxn: $\text{HS}^- + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{S} + \text{OH}^-$

When a substance acts as a base with water, OH^- is ALWAYS PRODUCED!!!

OTHER RELATIONSHIPS FOUND IN THE TABLE:

1. The HIGHER a species is on the left side = The STRONGER the acid
2. The LOWER the species is on the right side = The STRONGER the base
3. The STRONGER the ACID, the WEAKER it's CONJUGATE BASE + VICE VERSA!
4. AMPHIPROTIC species appear on BOTH SIDES of the table!



"THE LEVELLING EFFECT of WATER" *

WATER "levels out" the strength of all STRONG ACIDS to the same strength, therefore H_3O^+ is the STRONGEST ACID that exists in AQUEOUS SOLUTIONS!!!



Water also "levels out" the strength of all STRONG BASES to the same strength, therefore OH^- is the STRONGEST BASE that exists in AQUEOUS SOLUTIONS!!!!



DEFINITION of THE LEVELLING EFFECT:

All STRONG ACIDS are 100% IONIZED in aqueous solutions and are equivalent to solutions of H_3O^+ , while all STRONG BASES are 100% IONIZED in aqueous solutions and are equivalent to solutions of OH^- !

SEATWORK/HOMEWORK:

What sort of an electrical current would a STRONG ACID or BASE solution generate compared to a WEAK ACID or BASE solution? Explain Why

Exercises 21-27 pgs 125-126

PLO's: K1-K7