Thursday, May 16, 2019

New material:

STRONG VS. WEAK ACIDS & BASES (ARRHENIUS THEORY) NOTES

Strong acid: completely separates into H^{+1} and neg. ion – no molecules remain

- The 6 strong acids are HCl, HBr, HI, HNO_3, $HClO_4$, H_2SO_4

Weak acid: some molecules separate into H^{+1} and neg. ion – some remain as molecules

- any acid besides the 6 mentioned above

Strong base: completely separates into pos. ion and OH^- ion – none remain as a compound

- Solution of strong base is called alkaline
- Strong bases contain any Group 1 or 2 metal (except Be) with OH^-

Weak base: some separate into pos. ion and OH^- ion, while others remain stuck together as a cmpd.

- any base other than ones mentioned above

PROPERTIES OF ACIDS

1. taste sour
2. change color of indicators
3. combine w/ bases to make salt+water
4. *conduct electricity when dissolved
5. react w/ metals to make H_2 gas

PROPERTIES OF BASES

1. taste bitter
2. change color of indicators
3. combine w/ acids to make salt+water
4. *conduct electricity when dissolved
5. feel slippery

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*Strong acids + bases will conduct electricity better (brighter light) than weak acids + bases

BRONSTED-LOWRY ("B-L") THEORY OF ACIDS & BASES NOTES

~ Involve the transfer of a "proton". A proton is an H^{+1} ion

Acid: proton donor; gives away H^{+1}

conjugate base (CB): what is left after an acid gives away H^{+1}

Base: proton receiver; gains H^{+1}

conjugate acid (CA): what is made after a base receives H^{+1}

How do you determine an acid's conjugate base and a base's conjugate acid?

~ An acid is a proton donor. So, conjugate base is the formula for the acid with an H^{+1} removed/taken away.

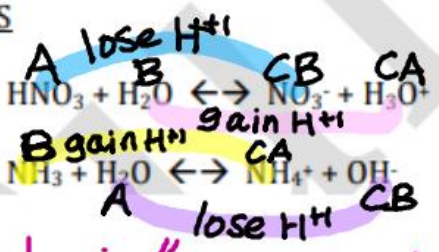
** EXAMPLE: Acid = HCl; Conjugate Base (CB) = Cl^{-1}

~ A base is a proton acceptor/recipient. So, conjugate acid is the formula for the base with an H^{+1} added to it.

** EXAMPLE: Base = NO_3^{-1}; Conjugate Acid (CA) = HNO_3

AMPHOTERISM NOTES

Example:



Water acts as (~~acid~~ / base)

Water acts as (acid / ~~base~~)

"amphoteric" = can act like an acid or a base

BRØNSTED - LOWRY ACIDS & BASES WORKSHEET

Label the Brønsted-Lowry acids (A), bases (B), conju
following reactions.

EXAMPLE: $H_2O + Cl^- \leftrightarrow OH^- + HCl$

A B CB CA

B A CA CB

1. $C_6H_5NH_2 + H_2O \leftrightarrow C_6H_5NH_3^+ + OH^-$

BRØNSTED - LOWRY ACIDS & BASES WORKSHEET

Label the Brønsted-Lowry acids (A), bases (B), conjugate acids (CA), and conjugate bases (CB) in the following reactions.

EXAMPLE: $H_2O + Cl^- \leftrightarrow OH^- + HCl$

A B CB CA

1. $C_6H_5NH_2 + H_2O \leftrightarrow C_6H_5NH_3^+ + OH^-$

2. $H_2SO_4 + OH^- \leftrightarrow HSO_4^- + H_2O$

3. $HSO_4^- + H_2O \leftrightarrow SO_4^{-2} + H_3O^+$

4. $HBr + OH^- \leftrightarrow H_2O + Br^-$

5. $NH_3 + H_2O \leftrightarrow NH_4^+ + OH^-$

CONJUGATE ACID-BASE PAIRS WORKSHEET

ACID	BASE
H_2SO_4	HSO_4^-
H_3PO_4	$H_2PO_4^{-1}$
	F^-
	NO_3^-
$H_2PO_4^-$	HPO_4^{-2}
H_2O	HO^{-1} OH^{-1}

ACID	BASE
	SO_4^{-2}
HPO_4^{-2}	PO_4^{-3}
NH_4^+	
	H_2O
	NO_2^-
NH_3	

$H_3PO_4^{\ 0}$
$-\ H^{\ -(1)}$
$H_2PO_4^{\ -1}$

STRENGTH RULE OF ACIDS & BASES (B-L theory):

**The stronger a base is, the weaker its conjugate acid.

**The weaker a base is, the stronger its conjugate acid.

**The stronger an acid is, the weaker its conjugate base.

Which is a weaker base, Cl^- or NO_2^-?

HCl HNO_2

Which is a stronger base, HSO_4^- or $H_2PO_4^-$?

Homework: Finish two Bronsted-Lowry theory worksheets