Name: Key.
Blk:_____ Date:_____

Chemistry 12
ACID BASE PART II Lesson #21
Metal and Non-Metal Oxides

When a metal oxide is added to water there is an initial dissociation reaction, such as:

$Na_2O\ (s) \rightarrow 2\ Na^+\ (aq) + O^{2-}\ (aq)$

The O^{2-} present in water reacts to form OH^- as seen in the below example:

The OH^- is strongly attracted to the Na^+ that is present and forms NaOH.

$O^{2-} + H_2O \rightarrow 2OH^-$; $2Na^+ + 2OH^- \rightarrow 2NaOH$

The overall balanced equation is:

$Na_2O + H_2O \rightarrow 2\ NaOH$
(synthesis)

Example 1. Write out the balanced equations for the following metal oxides in water:

a. $SrO_{(s)} + H_2O_{(l)} \rightarrow Sr(OH)_{2\ (aq)}$
b. $Rb_2O_{(s)} + H_2O_{(l)} \rightarrow 2RbOH_{(aq)}$
c. $CaO_{(s)} + H_2O_{(l)} \rightarrow Ca(OH)_{2\ (aq)}$

} Synthesis rxns

CONCLUSION: METAL OXIDES FORM BASIC SOLUTIONS!!!!

When a non-metal oxide is added to water bonds to the existing oxide portion of the molecule to create an ACID.

Example: $SO_3 + H_2O \rightarrow H_2SO_4$

Example 2. Write out the balanced equations for the following non-metal oxides in water:

a. $CO_{2(g)} + H_2O_{(l)} \rightarrow H_2CO_{3\ (aq)}$
b. $N_2O_{5(g)} + H_2O_{(l)} \rightarrow 2\ HNO_{3\ (aq)}$
c. $SO_{2(g)} + H_2O_{(l)} \rightarrow H_2SO_{3\ (aq)}$

(Synthesis)

CONCLUSION: NON-METAL OXIDES FORM ACIDIC SOLUTIONS!!

*recall metallic trend from Chem 11 → ↑ metallic character as you move left + ↓

SEATWORK/HOMEWORK: Exercises 144-145 pg 185 in HEBDEN
PLO's: R1

∴ most basic metal oxide is Fr_2O
most acidic non-metal oxide is F_2O