Name:_____
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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:

$Na_2O(s) \rightarrow 2\,Na^+(aq) + O^{2-}(aq) + H_2O(\ell) \rightarrow 2\,OH^-$

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

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

The overall balanced equation is:

$Na_2O(s) + H_2O(\ell) \rightarrow 2\,NaOH(aq)$ } synthesis

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

a. SrO $+ H_2O(\ell) \rightarrow Sr(OH)_2(aq)$
b. $Rb_2O + H_2O(\ell) \rightarrow 2\,RbOH(aq)$
c. CaO $+ H_2O(\ell) \rightarrow Ca(OH)_2(aq)$

CONCLUSION: METAL OXIDES FORM Basic aqueous SOLUTIONS!!!!

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

Example: $SO_3 + H_2O \rightarrow H_2SO_4$ (synthesis)

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

a. $CO_2 + H_2O(\ell) \rightarrow H_2CO_3(aq)$ ← normal rain
b. $N_2O_5 + H_2O(\ell) \rightarrow 2\,HNO_3(aq)$ } acid rain
c. $SO_2 + H_2O(\ell) \rightarrow H_2SO_3(aq)$ }

CONCLUSION: NON-METAL OXIDES FORM acidic aqueous SOLUTIONS!!

TRENDS in P.T → more metallic ... more basic
more non-metallic ... more acidic

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