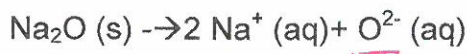


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Chemistry 12  
ACID BASE PART II Lesson #21  
Metal and Non-Metal Oxides

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



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

The  $\text{OH}^-$  is strongly attracted to the  $\text{Na}^+$  that is present and forms  $\text{NaOH}$ .

The overall balanced equation is:  
 $\text{O}^{2-} + \text{H}_2\text{O} \rightarrow 2\text{OH}^-$  ;  $2\text{Na}^+ + 2\text{OH}^- \rightarrow 2\text{NaOH}$



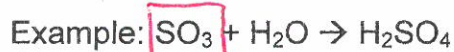
**Example 1.** Write out the balanced equations for the following metal oxides in water:

- a.  $\text{SrO} (\text{s}) + \text{H}_2\text{O} (\text{l}) \rightarrow \text{Sr}(\text{OH})_2 (\text{aq})$   
b.  $\text{Rb}_2\text{O} (\text{s}) + \text{H}_2\text{O} (\text{l}) \rightarrow 2\text{Rb}(\text{OH}) (\text{aq})$   
c.  $\text{CaO} (\text{s}) + \text{H}_2\text{O} (\text{l}) \rightarrow \text{Ca}(\text{OH})_2 (\text{aq})$

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

- a.  $\text{CO}_2 (\text{g}) + \text{H}_2\text{O} (\text{l}) \rightarrow \text{H}_2\text{CO}_3 (\text{aq})$   
b.  $\text{N}_2\text{O}_5 (\text{g}) + \text{H}_2\text{O} (\text{l}) \rightarrow 2 \text{HNO}_3 (\text{aq})$   
c.  $\text{SO}_2 (\text{g}) + \text{H}_2\text{O} (\text{l}) \rightarrow \text{H}_2\text{SO}_3 (\text{aq})$

(synthesis)

**CONCLUSION:** NON-METAL OXIDES FORM ACIDIC SOLUTIONS!!

\* recall metallic trend from Chem 11  $\rightarrow$   $\uparrow$  metallic character as you move left +  $\downarrow$

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

most ~~basic~~ basic metal oxide is  $\text{Fr}_2\text{O}$   
most ~~acidic~~ acidic non-metal oxide is  $\text{F}_2\text{O}$