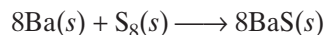
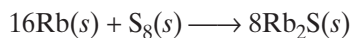
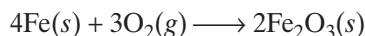
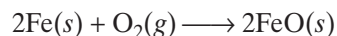


The other Group 2 elements react in a similar manner, forming oxides with the formula MO , where M represents the metal. The Group 1 metals form oxides with the formula M_2O , for example, Li_2O . The Group 1 and Group 2 elements react similarly with sulfur, forming *sulfides* with the formulas M_2S and MS , respectively. Examples of these types of synthesis reactions are shown below.

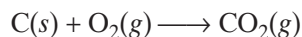
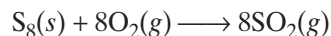


Some metals, such as iron, combine with oxygen to produce two different oxides.

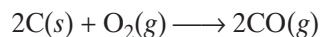


In the product of the first reaction, iron is in an oxidation state of +2. In the product of the second reaction, iron is in an oxidation state of +3. The particular oxide formed depends on the conditions surrounding the reactants. Both oxides are shown below in **Figure 8**.

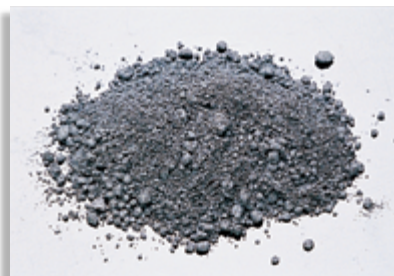
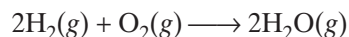
Nonmetals also undergo synthesis reactions with oxygen to form oxides. Sulfur, for example, reacts with oxygen to form sulfur dioxide. And when carbon is burned in air, carbon dioxide is produced.



In a limited supply of oxygen, carbon monoxide is formed.



Hydrogen reacts with oxygen to form dihydrogen monoxide, better known as water.



(a)



(b)

FIGURE 8 Iron, Fe , and oxygen, O_2 , combine to form two different oxides: (a) iron(II) oxide, FeO , and (b) iron(III) oxide, Fe_2O_3 .



(a)



(b)

FIGURE 7 Magnesium, Mg , pictured in (a), undergoes a synthesis reaction with oxygen, O_2 , in the air to produce magnesium oxide, MgO , as shown in (b).