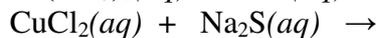
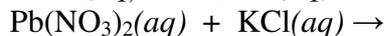
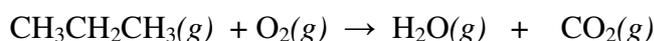


Ionic equations, calculations involving concentrations, stoichiometry

1. Find the net balanced ionic equation for each of the following:



2. Propane gas burns on air producing water and carbon dioxide:



Balance the equation and then calculate how many grams of water and carbon dioxide will result from complete burning of 10 liters of propane gas (consider molar volume at 25 °C and atmospheric pressure).

3. Nitrogen gas can be prepared by passing a gaseous ammonia over solid copper(II) oxide at high temperatures:

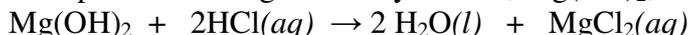


Suppose you have 20 g of copper oxide and 15 g of gaseous ammonia. How many liters of nitrogen gas can you produce from these reagents? Consider that about 10 % of nitrogen gas will be lost in your apparatus. (AW of copper 63.55)

4. Baking soda, NaHCO_3 , is often used as an antacid. It neutralizes hydrochloric acid in the stomach:

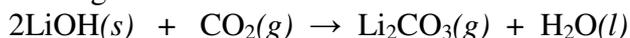


Aqueous suspension of magnesium hydroxide, $\text{Mg}(\text{OH})_2$, can also be used as an antacid:



Which is more potent antacid per gram, NaHCO_3 or $\text{Mg}(\text{OH})_2$?

5. Solid lithium hydroxide is used in space shuttles to remove exhaled carbon dioxide from the living environment:



Imagine that you are planning a space mission of two astronauts for 72 hours. One astronaut will produce 250 ml of CO_2 per minute at rest. How many kg of solid lithium hydroxide are needed for the mission?

(according to Steven S. Zumdahl: Chemistry, 4th edition, Houghton Mifflin Co., Boston, 1997)