

CHAPTER 7	Law of Combining Volumes	BLM 7.2.8
ASSESSMENT		

These problems involve stoichiometry of gases, but since the temperatures and the pressures of all gaseous reactants and products are the same, the coefficients that balance the equation represent the molar ratios as well. (Avogadro's hypothesis states that equal volumes of any gases under the same conditions of temperature and pressure will contain the same number of particles.)

Solve these questions assuming that the conditions of temperature and pressure of both reactants and products are the same.

1. Write the reaction for the formation of water vapour from hydrogen and oxygen gas.

(a) How many moles of hydrogen react with 3.4 mol of oxygen gas?

(b) How many litres of water vapour would form if 9.4 L of oxygen react?

2. Write the balanced equation for the combustion of propane ( $\text{C}_3\text{H}_8(\text{g})$ ).

(a) How many litres of propane must react in order to make 2.36 L of water vapour?

(b) How many moles of oxygen must react to produce 35.8 mol of carbon dioxide?

(c) The total volume of products that form if 9.53 L of propane reacted with oxygen would be \_\_\_\_\_ L.

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3. Write the reaction between sulfur and oxygen to produce sulfur trioxide gas.

(a) How many litres of sulfur trioxide would form from the reaction of 0.65 L of oxygen?

(b) How many moles of oxygen need to react to form 1.56 mol of sulfur trioxide?

(c) What information would you need to find out how much sulfur must react to form 65.0 L of sulfur trioxide?