

# REACTING GAS VOLUMES

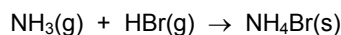


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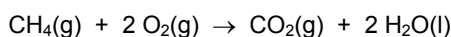
1) What volume of oxygen is required to burn the following gases, and what volume of carbon dioxide is produced?

- a) 1 dm<sup>3</sup> of methane       $\text{CH}_4(\text{g}) + 2 \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2 \text{H}_2\text{O}(\text{l})$
- b) 20 cm<sup>3</sup> of butene       $\text{C}_4\text{H}_8(\text{g}) + 6 \text{O}_2(\text{g}) \rightarrow 4 \text{CO}_2(\text{g}) + 4 \text{H}_2\text{O}(\text{l})$
- c) 500 cm<sup>3</sup> of ethyne       $2 \text{C}_2\text{H}_2(\text{g}) + 5 \text{O}_2(\text{g}) \rightarrow 4 \text{CO}_2(\text{g}) + 2 \text{H}_2\text{O}(\text{l})$
- d) 750 cm<sup>3</sup> of benzene       $2 \text{C}_6\text{H}_6(\text{g}) + 15 \text{O}_2(\text{g}) \rightarrow 12 \text{CO}_2(\text{g}) + 6 \text{H}_2\text{O}(\text{l})$

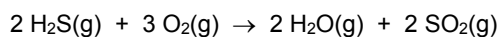
2) When 100 cm<sup>3</sup> of hydrogen bromide reacts with 80 cm<sup>3</sup> of ammonia, a white solid is formed and some gas is left over. What gas and how much of it is left over?



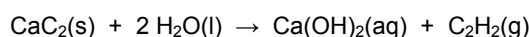
3) 100 cm<sup>3</sup> of methane was reacted with 500 cm<sup>3</sup> of oxygen. What is the total volume of all gases at the end, and indicate how much there is of each gas?



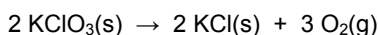
4) If 4 dm<sup>3</sup> of hydrogen sulphide is burned in 10 dm<sup>3</sup> of oxygen, what is the final volume of the mixture (give the volume of each gas at the end)?



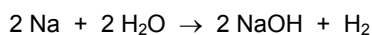
5) Find the volume of ethyne (C<sub>2</sub>H<sub>2</sub>) that can be prepared from 10.0 g of calcium carbide at 20°C and 100 kPa.



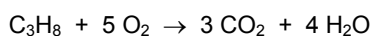
6) What mass of potassium chlorate (V) must be heated to give 1.00 dm<sup>3</sup> of oxygen at 20°C and 0.1 MPa.



7) What volume of hydrogen gas, measured at 298 K and 100 kPa, is produced when 1.00 g of sodium is reacted with excess water?



8) What volume of carbon dioxide gas, measured at 800 K and 100 kPa, is formed when 1 kg of propane is burned in a good supply of oxygen?



9) 10 cm<sup>3</sup> of a hydrocarbon, C<sub>x</sub>H<sub>y</sub>, were exploded with an excess of oxygen. There was a contraction in volume of 30 cm<sup>3</sup>. When the products were treated with sodium hydroxide (which reacts with carbon dioxide), there was a further contraction of 30 cm<sup>3</sup>. Deduce the formula of the hydrocarbon, given that all volumes were measured under the same conditions.