

What Are Combustion Reactions?

Worksheet

Combustion is a reaction where a fuel (often a hydrocarbon) burns with oxygen: $\text{CH} + \text{O} \rightarrow \text{CO} + \text{HO} + \text{heat}$.

Complete combustion requires sufficient oxygen; incomplete combustion produces carbon monoxide (CO) and soot.



Questions

1. Complete combustion of CH produces

- A) C + HO
- B) CO + HO
- C) CO + H₂O
- D) CO + H

2. Is combustion endothermic or exothermic?

- A) Endothermic
- B) Exothermic
- C) Neutral
- D) Depends on fuel

3. What does incomplete combustion produce?

- A) Only CO
- B) Only H₂O
- C) CO and soot
- D) O and heat

4. Why does a candle flame flicker?

- A) Incomplete combustion of wax
- B) Air currents
- C) Heat waves
- D) All of the above

5. Write the balanced equation for complete combustion of methane (CH₄).

6. Write the balanced equation for ethane (C₂H₆).

7. A car engine burns 1 mole of octane (C₈H₁₈) in 25 seconds. Write the balanced combustion equation.

8. Define: What is combustion?

9. Define: What are the products of complete hydrocarbon combustion?

10. Define: What causes incomplete combustion?

Answer Key

1. C) CO + HO - Complete combustion always produces CO and HO when oxygen is sufficient.
2. B) Exothermic - Combustion releases energy - it is exothermic.
3. C) CO and soot - Low oxygen CO (carbon monoxide) and black soot (carbon).
4. D) All of the above - Flickering results from air currents and heat waves disturbing the flame.
5. Methane: CH Complete combustion: CH + 2O CO + 2HO Check: Left: C=1, H=4, O=4; Right: C=1, H=4, O=4
6. Ethane: CH Products: CO and HO C: 2 atoms 2CO H: 6 atoms 3HO O balance: need 2(2)+3(1)=7 oxygen atoms 3.5 O Multiply by 2 to get whole numbers: 2CH + 7O 4CO + 6HO
7. Octane: CH C: 8 atoms 8CO H: 18 atoms 9HO O: need 8(2)+9(1)=25 oxygen atoms 12.5O Balance: 2CH + 25O 16CO + 18HO
8. A rapid oxidation reaction where fuel reacts with oxygen, releasing heat and light.
9. Carbon dioxide (CO) and water (HO).
10. Insufficient oxygen. It produces carbon monoxide (CO) and soot (C).

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