

# Ozonolysis Problems

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## Basic Problems

1. **2-butene** ( $\text{CH}_3\text{-CH=CH-CH}_3$ )  
Products: 2 molecules of **ethanal** ( $\text{CH}_3\text{CHO}$ )
  2. **1-pentene** ( $\text{CH}_2\text{=CH-CH}_2\text{-CH}_2\text{-CH}_3$ )  
Products: **formaldehyde** ( $\text{HCHO}$ ) and **butanal** ( $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CHO}$ )
  3. **Product is only formaldehyde**  
Alkene: **ethylene** ( $\text{CH}_2\text{=CH}_2$ )
  4. **Ethanal** ( $\text{CH}_3\text{CHO}$ ) and **propanal** ( $\text{CH}_3\text{-CH}_2\text{-CHO}$ )  
Alkene: **pent-2-ene** ( $\text{CH}_3\text{-CH=CH-CH}_2\text{-CH}_3$ )
  5. **Acetic acid** ( $\text{CH}_3\text{COOH}$ ) and **CO<sub>2</sub>**  
Alkyne: **propyne** ( $\text{CH}_3\text{-C}\equiv\text{CH}$ )
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## Moderate Problems

6. **C<sub>6</sub>H<sub>10</sub> gives one product**  
Alkene: **cyclohexene**  
Product: **adipic dialdehyde**
  7. **Benzaldehyde and ethanal**  
Alkene: **1-phenylpropene** ( $\text{Ph-CH=CH-CH}_3$ )
  8. **Cyclohexene**  
Product: **1,6-hexanedial** ( $\text{OHC-(CH}_2\text{)}_4\text{-CHO}$ )
  9. **Styrene** ( $\text{C}_6\text{H}_5\text{-CH=CH}_2$ )  
Products: **benzaldehyde** ( $\text{C}_6\text{H}_5\text{CHO}$ ) and **formaldehyde** ( $\text{HCHO}$ )
  10. **2 moles of acetone** ( $\text{CH}_3\text{COCH}_3$ )  
Alkene: **2,3-dimethyl-2-butene** ( $\text{CH}_3\text{)}_2\text{C=C(CH}_3\text{)}_2$
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## Advanced Problems

11. **Oxalic acid** ( $\text{HOOC-COOH}$ ) and **acetic acid** ( $\text{CH}_3\text{COOH}$ )  
Alkene:  $\text{CH}_2\text{=C(COOH)-CH}_3$
12. **C<sub>7</sub>H<sub>12</sub> gives one ketone**  
Alkene: **3-heptene** ( $\text{CH}_3\text{CH}_2\text{CH=CHCH}_2\text{CH}_2\text{CH}_3$ )  
Product: 2 molecules of **butanone** ( $\text{CH}_3\text{COCH}_2\text{CH}_3$ )
13. **1,3-butadiene** ( $\text{CH}_2\text{=CH-CH=CH}_2$ )  
Products: 2 moles of **glyoxal** ( $\text{OHC-CHO}$ )

14. **cis- and trans-2-butene** ozonolysis both give **2 ethanal**

**Difference:** Physical properties (cis: liquid, trans: gas), ozonide formation and cleavage can distinguish.

15. **Glyoxal (OHC-CHO)** and **formaldehyde (HCHO)**

**Alkene: vinyl aldehyde (CH<sub>2</sub>=CH-CHO)**

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