

REACTION RATES & ITS AFFECTING FACTORS

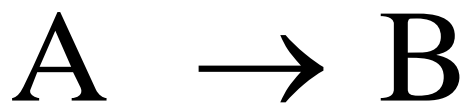
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Reaction Rates

- **Reaction Rates**
- **Factors affecting rate**
- **Quantitative rate expressions**
- **Determination**
- **Factors**
- **Models for rates**
- **Reaction mechanisms**
- **Effects of catalysts**

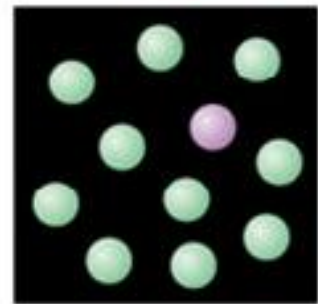
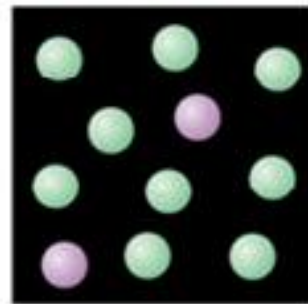
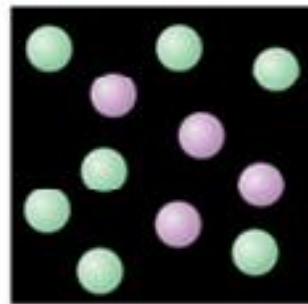
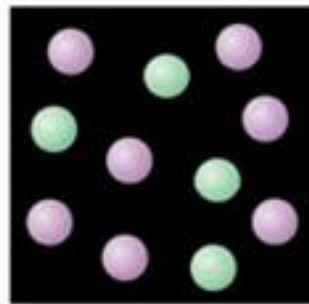
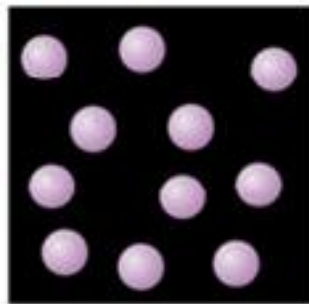
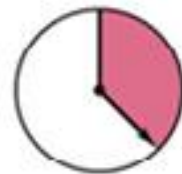
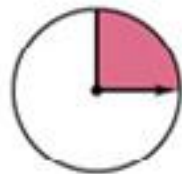
Rates

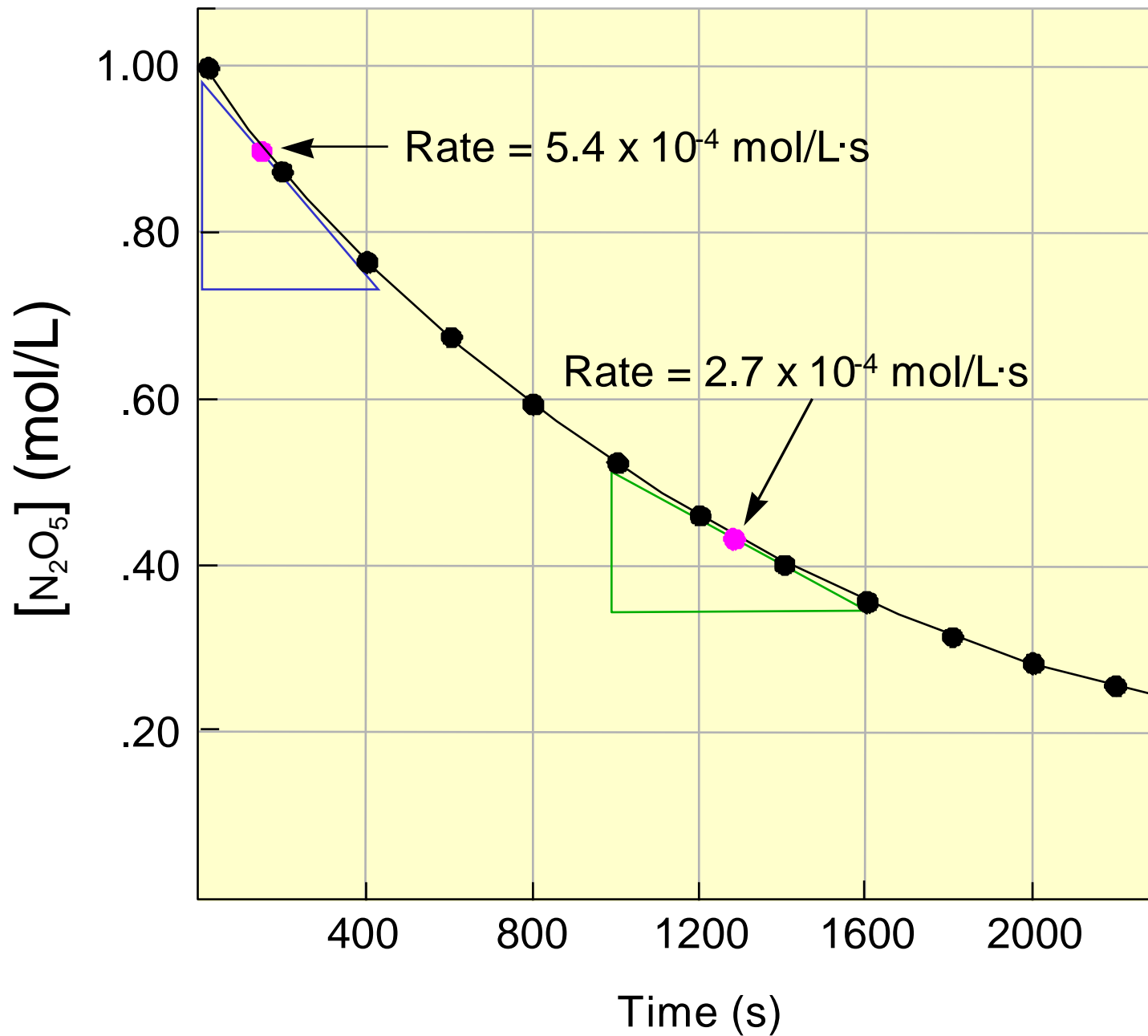
- Change in concentration of a reactant or product per unit time



$$\frac{\text{Change in conc, A}}{\text{Change in time, t}} = \frac{[A]_t - [A]_0}{t_t - t_0} = \frac{\Delta[A]}{\Delta t}$$

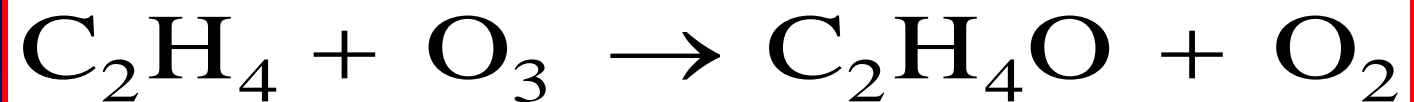
Reaction Rate





Factors affecting rates

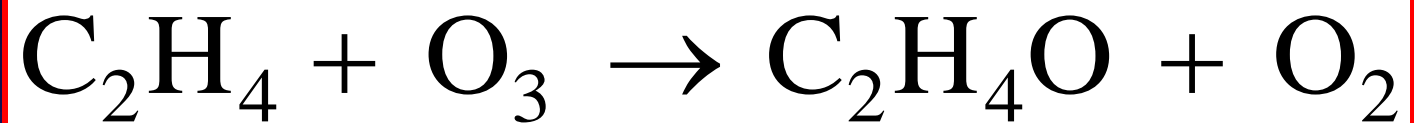
- Nature of the reactants
- State of subdivision / surface area
- Concentration
- Temperature
- Catalysts



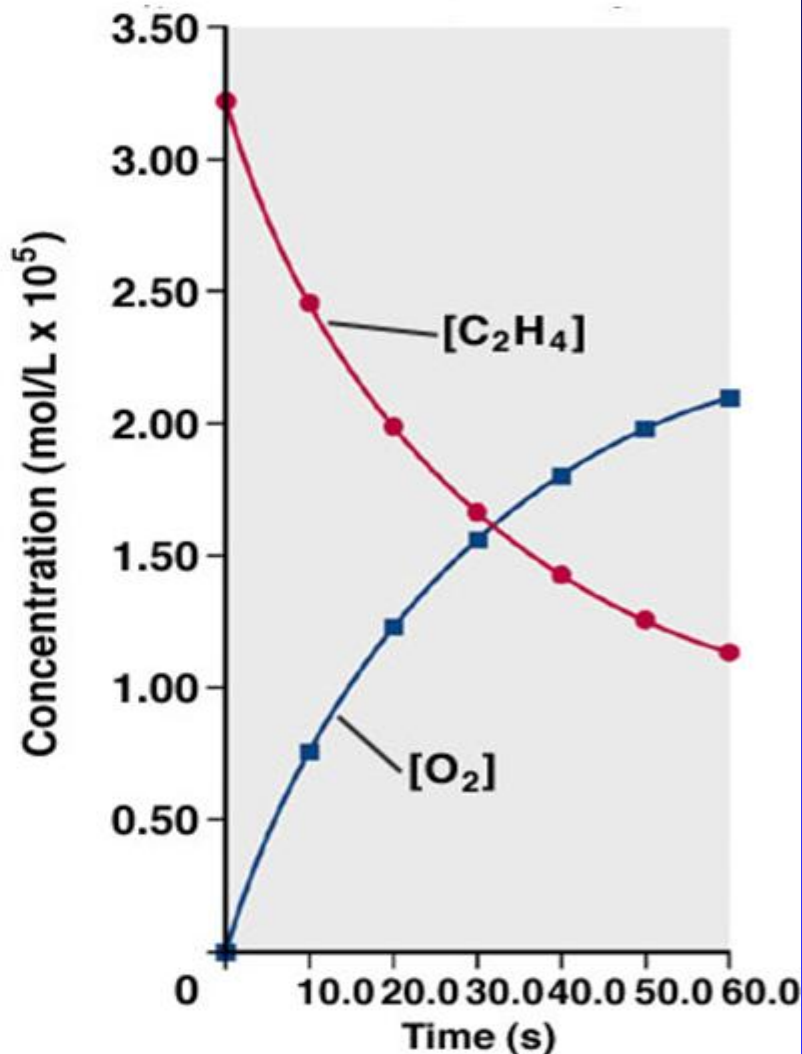
Concentration of O_3 vs. Time

Table 16.1 O_3 Concentration at Various Times in Its Reaction with C_2H_4 at 303 K

Time (s)	Concentration of O_3 (mol/L)
0.0	3.20×10^{-5}
10.0	2.42×10^{-5}
20.0	1.95×10^{-5}
30.0	1.63×10^{-5}
40.0	1.40×10^{-5}
50.0	1.23×10^{-5}
60.0	1.10×10^{-5}

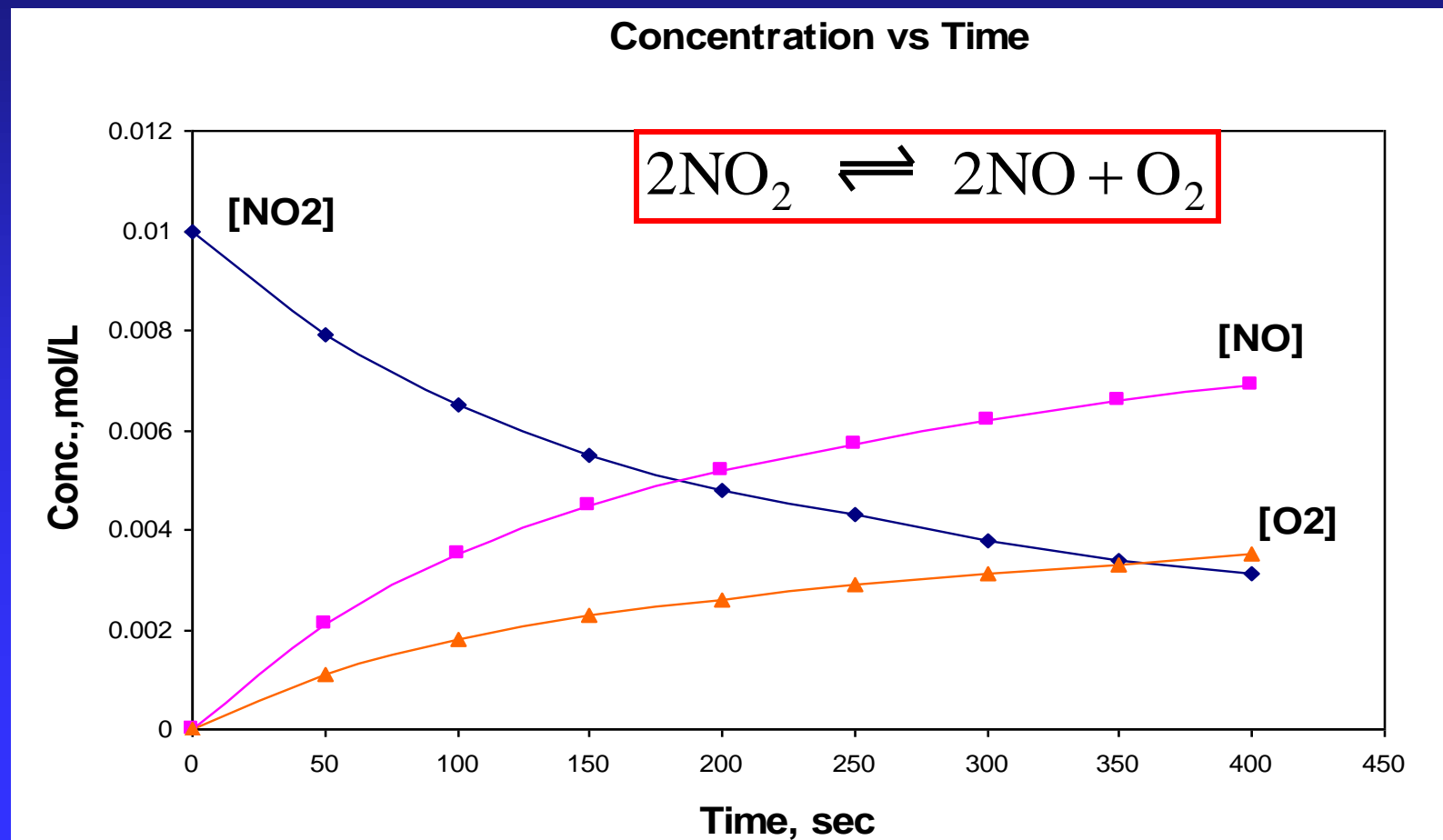


**Plots of $[\text{C}_2\text{H}_4]$
and $[\text{O}_2]$
vs. Time**



Graph: Concentration vs. time

$$\frac{\Delta[\text{NO}_2]}{\Delta t} = \frac{[\text{NO}_2]_{400} - [\text{NO}_2]_0}{t_{400} - t_0} = \frac{[0.0031] - [0.0100]}{400 - 0} = -1.725 \times 10^{-5} \text{ M}$$

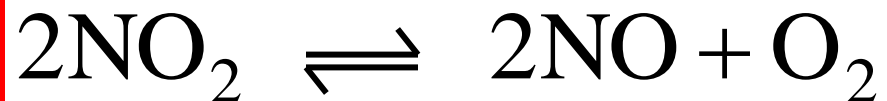


Rate Laws

$$\text{rate} = k[A]^m [B]^n$$

k = rate constant

m, n = order



$$\text{rate} = k[\text{NO}_2]^n$$

Thank
you!

