

What is Reaction Kinetics?

Worksheet

Reaction kinetics examines the rate at which reactants transform into products. Rate depends on concentration, temperature, catalyst presence, pressure and surface area.

Questions

- 0.8 mol/L reactant consumed in 40 s. Average rate?
 - 0.02 mol/Ls
 - 0.05 mol/Ls
 - 0.2 mol/Ls
 - 32 mol/Ls
- Which factor does NOT directly speed a reaction?
 - Increasing concentration
 - Raising temperature
 - Adding a catalyst
 - Increasing product amount
- A catalyst works by
 - Increasing concentration
 - Lowering activation energy
 - Providing energy
 - Shifting equilibrium
- Reaction rate typically has units
 - mol/s
 - L/s
 - mol/Ls
 - Lmol/s
- In 30 s, 0.6 mol/L of reactant is consumed. What is the average rate?
- A catalyst speeds a reaction by 50%. If uncatalysed rate is 0.01 mol/Ls, new rate?
- Temperature rises 10 C, doubling the reaction rate. Old rate 0.04 mol/Ls, new rate?
- Define: Define reaction kinetics.
- Define: What is the rate of reaction?
- Define: How does temperature affect reaction rate?

Answer Key

1. A) 0.02 mol/Ls - rate = $c/t = 0.8/40 = 0.02 \text{ mol/Ls}$.
2. D) Increasing product amount - Adding product does not increase reactant concentration or provide energy; it may shift equilibrium backward.
3. B) Lowering activation energy - Catalyst reduces the activation barrier, allowing more collisions to react.
4. C) mol/Ls - Rate is (concentration)/(time) = $(\text{mol/L})/\text{s} = \text{mol/Ls}$.
5. rate = c/t rate = $0.6 \text{ mol/L} / 30 \text{ s}$ rate = 0.02 mol/Ls
6. Increase = 50% of 0.01 Increase = 0.005 mol/Ls New rate = $0.01 + 0.005 = 0.015 \text{ mol/Ls}$
7. New rate = old rate $\times 2$ New rate = $0.04 \times 2 = 0.08 \text{ mol/Ls}$
8. The study of how fast reactions occur and what affects their speed: concentration, temperature, catalyst, pressure.
9. The change in concentration of reactant or product per unit time: c/t , units mol/Ls .
10. Higher temperature increases molecular collisions and average kinetic energy faster reaction (roughly doubles for each 10 C rise).

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