

26. Reaction kinetics

Starter Quiz · 课前小测

A-Level Chemistry

Name: _____ Score: _____

- The rate equation of a reaction:
 - ☐ can only be found by experiment, not from the balanced equation
 - ☐ is read straight off the balanced equation
 - ☐ never includes a rate constant
 - ☐ is always second order
- A reaction whose half-life stays the same as it proceeds is:
 - ☐ first order
 - ☐ zero order
 - ☐ second order
 - ☐ not happening
- The rate-determining step is:
 - ☐ the slowest step, which controls the overall rate
 - ☐ the fastest step
 - ☐ always the first step
 - ☐ the step with no intermediate
- A heterogeneous catalyst:
 - ☐ is in a different physical state from the reactants and works by adsorption and desorption
 - ☐ is in the same state as the reactants
 - ☐ is used up permanently
 - ☐ changes the enthalpy change
- If doubling $[A]$ doubles the rate, the order with respect to A is:
 - ☐ 1 (first order)
 - ☐ 0 (zero order)
 - ☐ 2 (second order)
 - ☐ 3
- A first-order reaction has a half-life of 100 s. What is k ? ($k = 0.693/t_{1/2}$)

- A constant half-life can be used to identify a first-order reaction.

☐ True ☐ False

- A heterogeneous catalyst is in a different physical state from the reactants.

☐ True ☐ False

- The power to which a reactant's concentration is raised in the rate equation is its _____.

- A first-order reaction has a constant half-life.

☐ True ☐ False

1. **can only be found by experiment, not from the balanced equation**

Orders must be measured experimentally; they cannot be deduced from the stoichiometric equation.

2. **first order**

A constant half-life (independent of concentration) is the signature of a first-order reaction.

3. **the slowest step, which controls the overall rate**

The slowest step is the bottleneck, so it determines the overall rate.

4. **is in a different physical state from the reactants and works by adsorption and desorption**

Heterogeneous = different state (e.g. solid + gases); reactants adsorb, react, then products desorb.

5. **1 (first order)**

Rate $\propto [\text{A}]^1$, so doubling $[\text{A}]$ doubles the rate — first order.

6. **0.00693**

$k = 0.693 / 100 = 0.00693$ (per second).

7. **True**

Only first-order reactions have a half-life that is independent of the concentration.

8. **True**

e.g. a solid catalyst with gaseous reactants.

9. **order**

The orders are found experimentally.

10. **True**

The half-life is independent of concentration.