Reaction kinetics

A-Level Chemistry · Vocabulary in context

Word	Example
rate equation /reɪt ɪ'kweɪʒn/	The **rate equation** is rate = k[A][B]. rate = k[A][B]
concentrations	The rate depends on the **concentrations** of the reactants.
reactants /rɪ'æktənts/	Only **reactants** in the slow step appear in the rate equation.
order of reaction /'ɔːdə ɒv rɪ'ækʃn/	The **order of reaction** for A is 2 in rate = k[A]^2. rate = k[A]^2 A 2
overall order of reaction /ˌəʊvə'rɔːl 'ɔːdə ɒv rɪ'ækʃn/	For rate = k[A][B], the **overall order of reaction** is 2. rate = k[A][B] 2
rate constant /reɪt 'kɒnstənt/	The **rate constant** k gets larger at higher temperature. k
balanced equation	The **balanced equation** cannot tell you the orders.
initial rates method	The **initial rates method** changes one concentration at a time.
first order	If doubling [A] doubles the rate, the reaction is **first order** in A. [A] A
second order	If doubling [B] quadruples the rate, the reaction is **second order** in B. [B] B
concentration–time graph	A **concentration–time graph** for a first-order reaction has a constant half-life.

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half-life /hɑːf laɪf/	After one **half-life**, half the nuclei have decayed.
origin /ˈɒrɪdʒɪn/	For first order, the rate–concentration graph passes through the **origin**.
steps /steps/	Most reactions happen in several **steps**.
rate-determining step /reɪt dɪˈtɜːmɪnɪŋ step/	The slowest step is the **rate-determining step**.
species /ˈspiːsiːz/	Every **species** in the rate equation takes part in or before the slow step.
intermediate /ˌɪntəˈmiːdiət/	An **intermediate** forms in one step and is used up in the next.
mechanism /ˈmekənɪzəm/	A **mechanism** must fit both the rate equation and the overall equation.
activation energy /ˌæktɪˈveɪʃn ˈenədʒi/	A match gives the **activation energy** to start the fire.
Catalysts /ˈkætəlɪsts/	**Catalysts** speed up a reaction without being used up.
heterogeneous catalyst /ˌhetrəˈdʒiːnɪəs ˈkætəlɪst/	Iron is a **heterogeneous catalyst** in the Haber process.
physical state	A heterogeneous catalyst is in a different **physical state** from the reactants.
adsorption /ədˈsɔːpʃn/	**Adsorption** holds the gas molecules on the catalyst surface.
weakened	Adsorption leaves the reactant bonds **weakened**.

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desorption /dɪˈsɔːpʃn/	**Desorption** lets the products leave the catalyst surface.
Haber process /ˈheɪbə ˈprəʊses/	The **Haber process** makes ammonia.
catalytic converter /ˌkætəˈlɪtɪk kənˈvɜːtə/	A **catalytic converter** cleans a car's exhaust.
homogeneous catalyst /həˈmɒdʒɪnɪəs ˈkætəlɪst/	A **homogeneous catalyst** is in the same phase as the reactants.
reformed	A homogeneous catalyst is **reformed** in a later step.
oxidise /ˈɒksɪdaɪz/	Nitrogen oxides help **oxidise** sulfur dioxide in the air.
atmospheric	**Atmospheric** SO_2 is oxidised to SO_3. SO_2 SO_3
repel /rɪˈpel/	Two negative ions **repel** each other.
zero order	If the rate does not change with [A], the reaction is **zero order** in A. [A] A

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