

OCR (B) Chemistry A-Level

PL2 - Kinetics

Flashcards

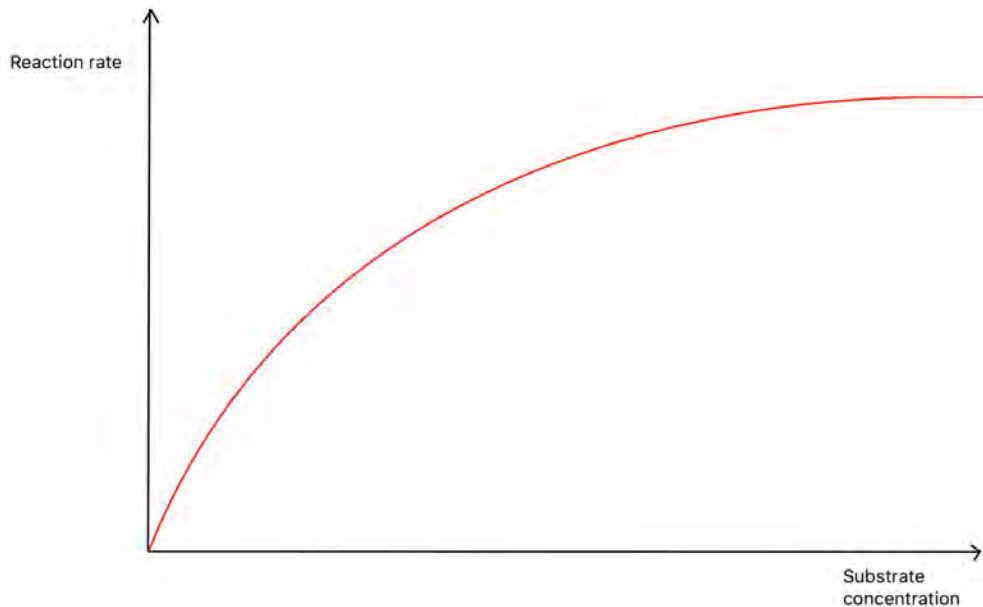
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What does a rate vs. substrate concentration graph look like for an enzyme-catalysed reaction?



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What is the order with respect to the substrate at low and high concentrations?



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- Low concentrations: The order with respect to the substrate is 1.
- High concentrations: The order with respect to the substrate is 0.



Why are enzymes specific?



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- Enzymes are proteins with tertiary level structure and hence have a specific 3D shape.
- Enzymes have an **active site** which is highly specific and binds to complementary substrate only (forming an enzyme-substrate complex), allowing the reaction to occur.



How is enzyme activity affected by temperature?



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- As temperature increases, enzymes and substrate have more kinetic energy.
- Therefore there are more frequent and successful collisions, forming more enzyme-substrate complexes.
- Rate of reaction increases.



What happens to the enzyme if temperature is too high?



What happens to the enzyme if temperature is too high?

- The enzyme becomes denatured:
- Some hydrogen bonds and other tertiary structure bonds are broken/altered.
- Hence the tertiary structure of the enzyme is different, along with the shape of its active site.
- Active site is no longer complementary to the substrate; it cannot bind to form enzyme-substrate complexes.
- Rate of reaction decreases.



Why are enzymes sensitive to pH?



Why are enzymes sensitive to pH?

- All enzymes have an optimum pH.
- Anything outside this range will result in a lower enzyme activity.
- A wildly different pH may alter tertiary structure bonds etc. and denature the enzyme, decreasing rate of reaction.



What is competitive inhibition?



What is competitive inhibition?

- A competitive inhibitor has a similar shape/structure to the substrate.
- It competes with the substrate for the active site of the enzyme, preventing it from binding.
- This lowers the number of enzyme-substrate complexes formed, decreasing rate of reaction.

