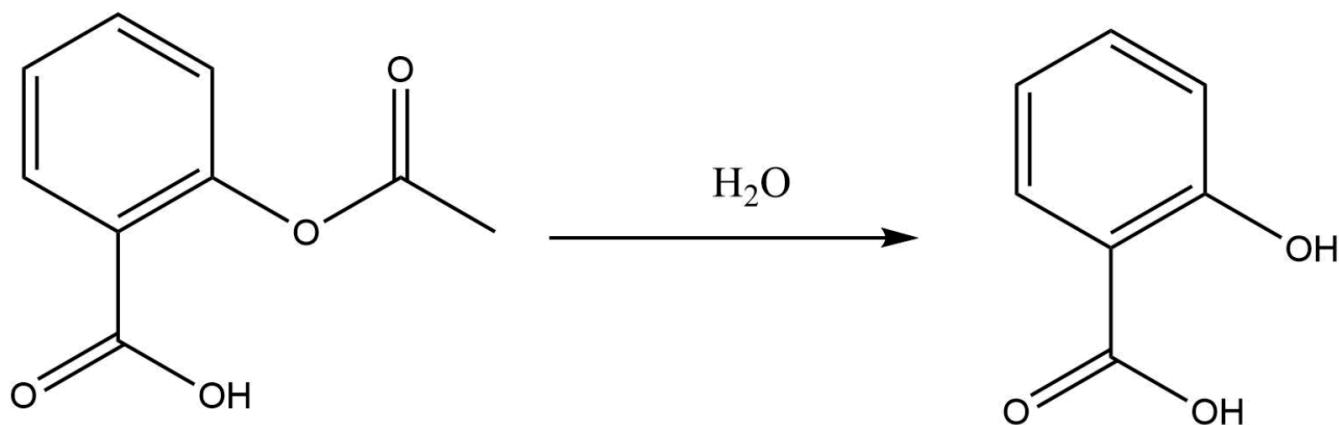


Analytical task

Imagine you are in a laboratory, and you encounter an aqueous solution of aspirin labeled as 1 M. You are aware that aspirin can decompose over time, but you are unsure how much this particular sample has decomposed. Consider how you might use two different measurement techniques (UV-Vis and titrations) to confirm the amount of hydrolysis that has occurred.



For this task, you will need to describe how you would confirm the concentration of the aspirin solution using the techniques mentioned. You can use the prompts below to help you generate a 5-minute video or presentation where you outline your procedure. Note that your response must include specific practical information, such as how exactly a stock solution is generated or how a titration is performed.

Prompts:

Calibration curves are a great way to confirm the concentration of a given solution.

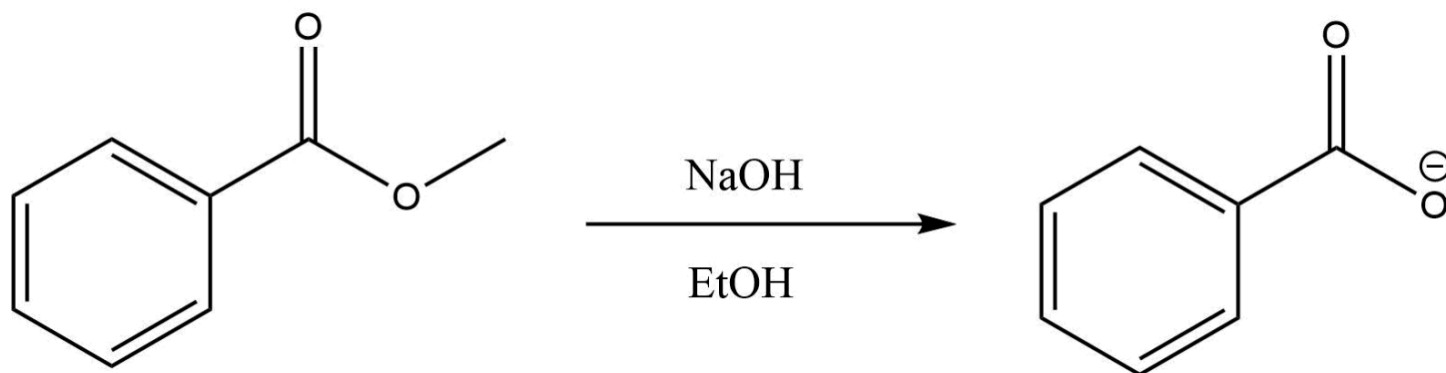
- How could you use one, alongside the UV-Vis apparatus?
- What techniques would you need to consider and how would you ensure accuracy?

Titration is a very common procedure used to measure the concentration of a given acid or base solution.

- How could you use this technique to confirm the degree of hydrolysis that has occurred?
- Make sure to detail the setup of the titration procedure including all steps from the rinsing of the glassware through to the final endpoint measured.
- What variation in the titration result would you expect for a hydrolysed sample of aspirin compared to a pure (unhydrolysed) aspirin?

Synthesis task

Imagine you are in a laboratory, and you are trying to decompose 5 g of an ester into a carboxylic acid. You know that this can be done by heating a solution of the ester in boiling ethanol (50 mL), in the presence of sodium hydroxide (5 g).



For this task, you will need to describe how you would do this and what techniques you would use to isolate/confirm the product. Use the prompts below to help you generate a 5-minute video or presentation where you outline your procedure. Note that you must include specific practical information, such as how exactly a liquid-liquid extraction is achieved.

Prompts:

- During the setup, will you weigh your starting materials by addition or by difference? Why?
- What glassware and equipment will you need to carry out the reaction?
- Once your system is heating, how will you confirm that the reaction is complete? (Hint: Consider the process of using a TLC plate)
- Once the reaction is confirmed to have completed, how will you isolate the resulting carboxylate? (Hint: Consider liquid-liquid extraction and acidification of your aqueous layer)
- Once isolated, how will you purify your product?
- Once purified, how will you confirm the purity of your sample? (Don't be afraid to consider the range of spectroscopic techniques discussed in CHEM1B)

