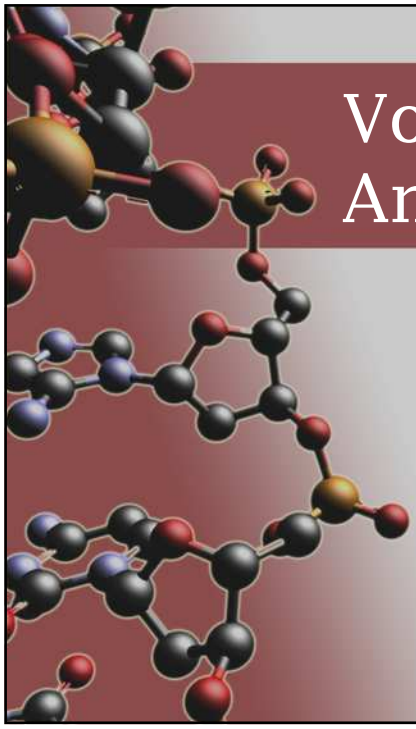

Volumetric Analysis Level 3

Revision
What's new?
Examples
Exercises

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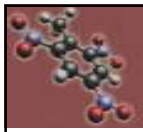
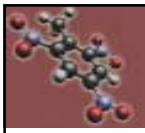


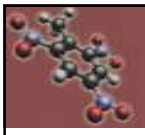
Revision I

- At level 2 we performed a number of titrations. They used acid and base reactions to determine the concentration of one of the solutions. We used the following key words:
  - Titre – the volume of liquid released from the burette
  - Aliquot – the volume of liquid measured out using a pipette
  - Standard solution – a solution that we know the concentration of
  - Indicator – the chemical that changes colour when a titration has reached it end point



Revision II

- A summary of the process by which we do the calculation goes like this:
  - Write a balanced equation for the reaction
  - Work out the amount of one of the chemicals (n = cv)
  - Use the balanced equation to work out the amount of the other reactant
  - Work out the concentration of the solution of 'unknown concentration' (c = n/v)
- This year things are not too different. That is except that we don't do acid-base titrations, we do redox titrations



What's New?

- The redox titration that we do this year make the whole process a little more difficult. Here are the reasons why:
  - We can't use the normal sort of indicator because we are not dealing with acids and bases – this makes the end point of the reaction more difficult to observe
  - Because we can't use a normal indicator, we normally have to convert our chemicals into a form that can be observed – this means that we have to deal with two balanced equations

Example I

- We want to analyse the concentration of bleach (OCl^-) in a solution but OCl^- (colourless) turns into chloride (also colourless). This make it difficult to observe. To help with this, we react OCl^- with Iodide to make iodine. We then test the iodine concentrations.

$$OCl^- + 2H^+ + 2I^- \rightarrow I_2 + Cl^- + H_2O$$

$$I_2 + 2S_2O_3^{2-} \rightarrow 2I^- + S_4O_6^{2-}$$

  - If in the titration we calculated that 1.20×10^{-3} moles of thiosulfate ($S_2O_3^{2-}$) was used, then what amount of:
    - Iodine was used?
    - OCl^- was present at the beginning?

Example II

The same reaction as before, but here are some more details.

- The students used a standard solution of thiosulfate ($0.113 molL^{-1}$) in the titration. They transferred 15mL aliquots of the (reacted) iodine solution into the flasks using pipettes. The titres of thiosulfate were:
  - 15.2mL, 15.0mL, 15.6mL, 15.2mL

$$OCl^- + 2H^+ + 2I^- \rightarrow I_2 + Cl^- + H_2O$$

$$I_2 + 2S_2O_3^{2-} \rightarrow 2I^- + S_4O_6^{2-}$$

- What is the:
  - Amount of thiosulfate used?
  - Amount of iodine reacted?
  - The amount OCl^- in the 15mL aliquots?
  - The concentration of the original OCl^- solution?