Question #60268, Chemistry / Other |

If 114mL of 0.008 04M NaOH completely titrates 118mL of H3PO4 solution, what is the molarity of the H3PO4 solution?

Answer:

The amount of used NaOH upon titration is determined as follows:

v(NaOH) = C(NaOH)×V(NaOH), where C – the concentration of NaOH and V – the volume of NaOH.

v(NaOH) = 0.00804 M × 114 ml = 0.91656 mmol

Taking into the account that sodium hydroxide reacts with H_3PO_4 according to the equation:

$3NaOH + H_3PO_4 \rightarrow Na_3PO_4 + 3H_2O$

it is clear that 3 molecules of NaOH neutralize 1 molecule of H_3PO_4.

Therefore the amount of titrated acid is:

$v(H_3PO_4) = v(NaOH)/3 = 0.91656$ mmol$/3 = 0.30552$ mmol

Then the concentration of H_3PO_4 solution is defined:

$C(H_3PO_4) = v(H_3PO_4)/V(H_3PO_4) = 0.30552$ mmol / 118 ml = 0.00259 M