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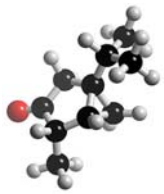
# 1.2 – AMOUNT OF SUBSTANCE – PPQ3



Name …… Form ……

3) The chloride of an element **Z** reacts with water according to the following equation.

$$ZCl_4(l) + 2\,H_2O(l) \rightarrow ZO_2(s) + 4\,HCl(aq)$$

A 1.304 g sample of $ZCl_4$ was added to water. The solid $ZO_2$ was removed by filtration and the resulting solution was made up to 250 $cm^3$ in a volumetric flask. A 25.0 $cm^3$ portion of this solution was titrated against a 0.112 mol $dm^{-3}$ solution of sodium hydroxide, of which 21.7 $cm^3$ were required to reach the end point.

Use this information to calculate the number of moles of HCl produced and hence the number of moles of $ZCl_4$ present in the sample. Calculate the relative molecular mass, $M_r$, of $ZCl_4$. From your answer deduce the relative atomic mass, $A_r$, of element **Z** and hence its identity.

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*(CHM01 Winter 2002)*