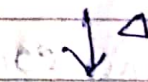
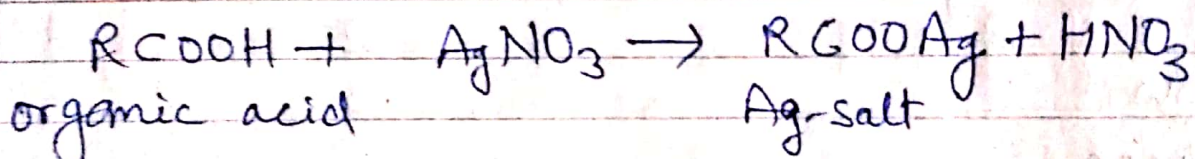


B.Sc. chemistry (H) Part-I, Paper-I (C)

Topic: → Determination of molecular weight (mol wt) of an organic acid by Ag-salt method.

The organic acid solution is neutralised with NH_4OH and heated to boil off excess NH_3 . A slight excess of AgNO_3 solution is then added to it and the precipitated Ag-salt is filtered, washed, dried and then weighed. This obtained Ag-salt is ignited in a crucible to metallic Ag-residue to constant weight.



Ag residue

Let, the weight of Ag-salt = w_1 g
& the weight of Ag residue = w_2 g

then,

$$\frac{\text{wt of Ag-salt}}{\text{wt of Ag-residue}} = \frac{(\text{Equivalent wt of anion}) + (\text{Equivalent wt of Ag}^+)}{\text{Equivalent wt. of Ag}}$$

$$\text{or } \frac{w_1}{w_2} = \frac{E_{\text{wt anion}} + 108}{108} = \frac{E_{\text{wt anion}}}{108} + \frac{108}{108}$$

$$\text{or } \frac{w_1}{w_2} = \frac{E_{\text{wt anion}}}{108} + 1$$

$$\text{or } \frac{w_1}{w_2} - 1 = \frac{\text{Eq wt anion}}{108}$$

$$\text{or } \frac{w_1 - w_2}{w_2} = \frac{\text{Eq wt anion}}{108}$$

$$\text{Eq wt anion} = \left(\frac{w_1 - w_2}{w_2} \right) \times 108$$

∴ Equivalent wt of acid

$$\text{Eq. acid} = \text{Eq. } \text{RCOO}^- + \text{Eq. } \text{H}^+$$

$$= \text{Eq wt anion} + \text{Eq. } \text{H}^+$$

$$= \frac{108(w_1 - w_2)}{w_2} + 1$$

$$= \frac{108w_1 - 108w_2 + w_2}{w_2}$$

$$= \frac{108w_1 - 107w_2}{w_2} = \frac{108w_1}{w_2} - 107$$

$$\boxed{\text{Mol. wt of acid} = \text{Eq. acid} \times \text{Basicity}}$$