

10.6 Determination of phosphorus – Photometric method

Apparatus

- UV-VIS spectrophotometer

Reagents

- Molybdovanadate reagent – Dissolve 40 g ammonium molybdate $4\text{H}_2\text{O}$ in 400 ml hot H_2O and cool. Dissolve 2 g ammonium metavanadate in 250 ml hot H_2O and cool; add 250 ml 70% HClO_4 . Gradually add molybdate solution to vanadate solution with stirring, and dilute to 2 litre.
- Phosphorus standard solutions – (i) Stock solution -2 mg/ml. Dissolve 8.788 g KH_2PO_4 in H_2O and dilute to 1 L (ii). Working solution – 0.1 mg/ml. Dilute 50 ml stock solution to 1 litre.
- Preparation of standard curve
- Transfer aliquots of working standard solution containing 0.5, 0.8, 1.0 and 1.5 mg P to 100 ml volumetric flasks. Treat as mentioned in determination (d). Prepare standard curve by plotting mg P against per cent T on semi log paper.
- Determination using UV-VIS spectrophotometer (Fig. 10.5).

Ash 2 g sample in 150 ml beaker about 4 h at 600°C . Cool, add 40 ml HCl (1+3) and several drops HNO_3 and bring to boiling point. Cool, transfer to 200 ml volumetric flask and dilute to volume with H_2O . Filter and place aliquot containing 0.5-1.5 mg P in 100 ml volumetric flask. Add 20 ml molybdovanadate reagent, dilute to volume with H_2O and mix well. Let stand 10 min; then read per cent T at 400 nm against 0.5 mg standard set at 100% T (Use 15 mm diameter cells.). Determine mg P from standard curve.



Fig. 10.5 UV-VIS spectrophotometer

Calculation: $\text{P (\%)} = \text{mg P in aliquot} / (\text{g sample in aliquot} \times 10)$

Reference: AOAC Official Method 965.17.