

Phosphate by molybdate assay

Teacher and technician worksheet

Equipment and materials

Each student or pair of students will require:

- burette
- 100 cm³ conical flask x 7 (or use one, thoroughly washing it between samples)
- 10 cm³ pipette
- 5 cm³ pipette
- 1 cm³ pipette
- small spatula
- Bunsen burner, tripod and gauze
- colorimeter and suitable filter (orange/red) - a solution of the complex displays maximum absorption at 650 nm.
- 100 cm³ volumetric flask x 7 (or use one, thoroughly washing it between samples)
- ammonium molybdate solution (7 cm³)
- ascorbic acid (vitamin C) (7 small spatula measures)
- potassium dihydrogenphosphate(V) solution containing 0.1 g dm⁻³ phosphorus as phosphate(V) (100 ppm) (52.5 cm³)
- solution of unknown phosphorus concentration (5 cm³)

Make sure students wear eye protection. Ammonium molybdate solution is an irritant.

Solution preparations

- Standard solution of potassium dihydrogenphosphate(V)
Weigh out 0.447 g potassium dihydrogenphosphate(V), KH₂PO₄, into a beaker, add deionised water and stir to dissolve the solid. Transfer the solution to a 1 dm³ volumetric flask and make up to the mark with deionised water.
- Ammonium molybdate solution, (NH₄)₆Mo₇O₂₄·4H₂O(aq)
Measure 170 cm³ of deionised water into a large conical flask and add 5 g of ammonium molybdate. Swirl to dissolve the solid and then very slowly add 80 cm³ concentrated sulfuric acid. Cool the reaction mixture by running cold water over the outside of the flask if it becomes too hot.