Zinc by zincon assay
Teacher and technician worksheet


(Original method: *Analytical Chemistry* **1959**, 31, 1226-1228)

**Equipment and materials**
Each student or pair of students will require:

- boiling tube x 6
- 5 cm$^3$ volumetric flask x 7 (or use one, thoroughly washing it between samples)
- 1 cm$^3$ graduated pipettes x 3
- colorimeter and suitable filter (red) A solution of the complex displays maximum absorption at 620 nm.
- buffer solution, pH 9 (3.5 cm$^3$)
- Zincon solution (2.1 cm$^3$)
- zinc sulfate solution containing 0.01 g dm$^{-3}$ Zn$^{2+}$ (10 ppm) (24 cm$^3$)
- solution of unknown Zn$^{2+}$ concentration (10 cm$^3$)

Make sure students wear eye protection.

**Solution preparations**
- Zinc sulfate solution containing 0.01 g dm$^{-3}$ Zn$^{2+}$ (10 ppm): Weigh out 0.0439 g zinc sulfate-7-water, ZnSO$_4$.7H$_2$O, dissolve in deionised water and make up to 1 dm$^3$. Zinc sulfate-7-water must be fresh to ensure that water of crystallisation has not been lost.

The solution may be made up by the serial dilution of a more concentrated solution. A 1000 ppm zinc ion solution is made by adding 1 g of zinc granules to 20 cm$^3$ of 2 mol dm$^{-3}$ sulfuric acid and leaving for 24 hours to react. The solution is then made up to 1 dm$^3$ in a volumetric flask.

- Buffer solution, pH 9: Dissolve 2.4 g of sodium hydroxide in 60 cm$^3$ of deionised water. Transfer solution to a 100 cm$^3$ volumetric flask, add 3.73 g of potassium chloride and 3.1 g of boric acid. Swirl the flask to dissolve the solids make up to volume with deionised water. Check the pH.

- Zincon solution: Dissolve 0.065 g of zincon in 1 cm$^3$ of 1 mol dm$^{-3}$ sodium hydroxide solution and dilute to 50 cm$^3$. Keep the deep red zincon solution in a fridge. It is stable to decomposition for about one week.