

Solution Preparation

1. A hydrate of sodium thiosulphate known as *hypo* ($\text{Na}_2\text{S}_2\text{O}_3 \cdot 5 \text{H}_2\text{O}$) is used as a fixer in photography because it readily dissolves silver compounds. Describe how to prepare 100 mL of a 0.120 mol/L *hypo* solution.
2. Sodium bicarbonate is used in baking as baking soda, or as one of the components of baking powder. Describe how to prepare 250 mL of a 0.821 mol/L solution of sodium bicarbonate.
3. Ammonium carbonate is a suitable replacement for the aqueous solution of ammonia as a household cleaning agent. Describe how to prepare 1.00 L of a 0.450 mol/L solution of ammonium carbonate.
4. Pots, kettles and frying pans and other non-aluminum household utensils can be economically cleaned of grease by using a solution of lye (sodium hydroxide). Describe how to prepare 2.50 L of a 0.100 mol/L solution of lye.

Dilution of Solutions

1. Determine the volume of concentrated hydrochloric acid (11.6 mol/L) required to prepare 10.0 L of a 0.200 mol/L solution.
2. What volume of 14.8 mol/L ammonia is required to prepare 2.0 L of a 1.0 mol/L solution?
3. What is the molar concentration of a sodium hydroxide solution prepared when 10 L of 19.1 mol/L solution is diluted to 400 L?
4. To what volume must 10.0 mL of 17.2 mol/L ethanol be diluted in order to prepare a 10.3 mol/L ethanol solution?
5. What is the molar concentration of household ammonia solution if 7.5 mL are diluted to 0.250 L to make a 0.021 mol/L solution?
6. To what volume must 60 L of a 2.50 mol/L toxic solution be diluted to in order to make the final concentration 1.00×10^{-6} mol/L (a fairly safe concentration)?