

29. What are the dissolved particles in a solution containing an ionic solute? What is the name for this kind of solution?

31. A solution contains 35 g of NaCl per 100 g of water at 25 °C. Is the solution unsaturated, saturated, or supersaturated? (See Figure 13.4.)

37. Some laboratory procedures involving oxygen-sensitive reactants or products call for using preboiled (and then cooled) water. Explain why this is so.

43. A soft drink contains 42 g of sugar in 311 g of H₂O. What is the concentration of sugar in the soft drink in mass percent?

49. Determine the amount of sucrose in each solution.
(a) 48 g of a solution containing 3.7% sucrose by mass
(b) 103 mg of a solution containing 10.2% sucrose by mass
(c) 3.2 kg of a solution containing 14.3% sucrose by mass

51. Determine the mass (in g) of each NaCl solution that contains 1.5 g of NaCl.
(a) 0.058% NaCl by mass
(b) 1.46% NaCl by mass
(c) 8.44% NaCl by mass

59. Calculate the molarity of each solution.
(a) 0.127 mol of sucrose in 655 mL of solution
(b) 0.205 mol of KNO₃ in 0.875 L of solution
(c) 1.1 mol of KCl in 2.7 L of solution

63. A 205-mL sample of ocean water contains 6.8 g of NaCl. What is the molarity of the solution with respect to NaCl?

65. How many moles of NaCl are contained in each solution?
(a) 1.5 L of a 1.2 M NaCl solution
(b) 0.448 L of a 0.85 M NaCl solution
(c) 144 mL of a 1.65 M NaCl solution

67. What volume of each solution contains 0.15 mol of KCl?
(a) 0.255 M KCl
(b) 1.8 M KCl
(c) 0.995 M KCl

77. Determine the concentration of Cl⁻ in each aqueous solution. (Assume complete dissociation of each compound.)
(a) 0.15 M NaCl
(b) 0.15 M CuCl₂
(c) 0.15 M AlCl₃

79. Determine the concentration of the cation and anion in each aqueous solution. (Assume complete dissociation of each compound.)
(a) 0.12 M Na₂SO₄
(b) 0.25 M K₂CO₃
(c) 0.11 M RbBr

81. A 122-mL sample of a 1.2 M sucrose solution is diluted to 500.0 mL. What is the molarity of the diluted solution?

83. Describe how you would make 2.5 L of a 0.100 M KCl solution from a 5.5 M stock KCl solution.

85. To what volume should you dilute 25 mL of a 12 M stock HCl solution to obtain a 0.500 M HCl solution?

87. How much of a 12.0 M HNO₃ solution should you use to make 850.0 mL of a 0.250 M HNO₃ solution?

89. Determine the volume of 0.150 M NaOH solution required to neutralize each sample of hydrochloric acid. The neutralization reaction is:



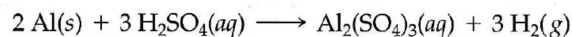
- (a) 25 mL of a 0.150 M HCl solution
(b) 55 mL of a 0.055 M HCl solution
(c) 175 mL of a 0.885 M HCl solution

91. Consider the reaction:



What volume of 0.225 M K₃PO₄ solution is necessary to completely react with 134 mL of 0.0112 M NiCl₂?

95. What is the minimum amount of 6.0 M H₂SO₄ necessary to produce 15.0 g of H₂(g) according to the reaction:

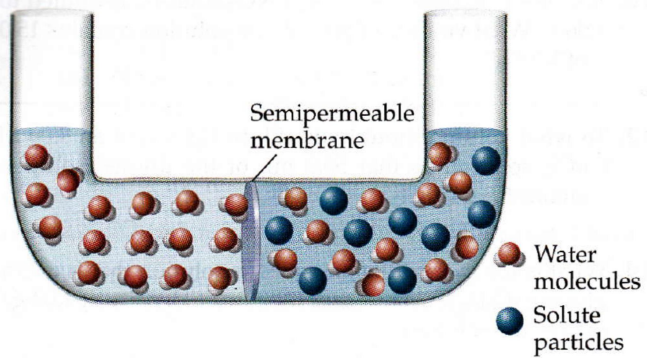


97. Calculate the molality of each solution.
(a) 0.25 mol solute; 0.250 kg solvent
(b) 0.882 mol solute; 0.225 kg solvent
(c) 0.012 mol solute; 23.1 g solvent

101. Calculate the freezing point of a water solution at each concentration.
(a) 0.85 *m*
(b) 1.45 *m*
(c) 4.8 *m*
(d) 2.35 *m*

103. Calculate the boiling point of a water solution at each concentration.
(a) 0.118 *m*
(b) 1.94 *m*
(c) 3.88 *m*
(d) 2.16 *m*

131. Consider the molecular views of osmosis cells. For each cell, determine the direction of water flow.
(a)



(b)

