

## CHAPTER 17 LEARNING OBJECTIVES

To satisfy the minimum requirements for this course, you should be able to:

Explain how a buffer works on the molecular level and be able to

- calculate the pH of a given buffer,
- describe how to prepare a buffer of a given pH
- discuss the importance of buffer capacity.
- calculate the change in pH of a simple buffer solution of known composition caused by adding a small amount of strong acid or base.

Sketch the general shapes of titration curves (see, for example, Figures 17.5, 17.6, 17.7, 17.8, and 17.9) and

- identify the dominant species present at various points in a titration
- explain how an indicator works

Define the solubility-product constant ( $K_{sp}$ ) for a salt and

- write the  $K_{sp}$  expression for a given reaction, or the balanced chemical reaction for a given  $K_{sp}$
- calculate  $K_{sp}$  from solubility data and solubility from the value of  $K_{sp}$ .
- describe and calculate the effect of an added common ion on the solubility of a slightly soluble salt.
- relate  $Q$ , the ion product, to  $K_{sp}$  to determine whether precipitation will occur.

Understand the formation of complex ions and describe how complex formation can affect the solubility of a slightly soluble salt.

**To learn the material in this chapter, you should:**

- Review the “In Closing” and “Key Terms” sections of Chapter 17.
- Do the following:  
Exercises: 17.1, 17.2, 17.3, 17.4, 17.6, 17.8, 17.10  
Problem Solving Practice: 17.1, 17.3, 17.4, 17.8, 17.9, 17.10, 17.11, 17.14
- Test your knowledge by completing the assigned OWL modules.