Pearson

Chapter 14
Chemical Kinetics

Pouring ice water on a lizard slows the lizard down, making it easier to catch.

> "Nobody, I suppose, could devote many years to the study of chemical kinetics without being deeply conscious of the fascination of time and change: this is something that goes outside science into poetry."
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> —*Sir Cyril N. Hinshelwood (1897–1967)*

Learning Outcomes

IN THE PASSAGE QUOTED in this chapter opener, Oxford chemistry professor Sir Cyril Hinshelwood calls attention to an aspect of chemistry often overlooked by the casual observer—the mystery of change with time. Since the opening chapter of this book, you have learned that the goal of chemistry is to understand the

macroscopic world by examining the structure of the particles that compose it. In this chapter, we focus on understanding how these particles change with time, an area of study called chemical kinetics. The particulate world is anything but static. Thermal energy produces constant molecular motion, causing molecules to repeatedly collide with one another. In a tiny fraction of these collisions, something extraordinary happens—the electrons on one molecule or atom are attracted to the nuclei of another molecule or atom. Some bonds weaken and new bonds form—a chemical reaction occurs. Chemical kinetics is the study of how these kinds of changes occur in time.