

Most isotopes are stable, but some are unstable and spontaneously decay to a more stable form. It is the decay rate of unstable isotopes that geologists measure to determine the absolute age of rocks.

Radioactive Decay and Half-Lives

Radioactive decay is the process whereby an unstable atomic nucleus is spontaneously transformed into an

atomic nucleus of a different element. Three types of radioactive decay are recognized, all of which result in a change of atomic structure (Fig. 9-18). In **alpha decay**, the nucleus emits two protons and two neutrons with the result that the atomic number decreases by two and the atomic mass number decreases by four. **Beta decay** is the emission of a fast-moving electron from a neutron in the nucleus; the neutron is changed to a proton, and consequently the atomic number is increased by one,