Rates of Enzymatic Reactions

Reactions having the same half-times. Note that half-time, the second-order progress curve is than the first-order curve, but after first-order progress curve is the more rapidly the two. The half-time for a second-order reaction, is dependent on the initial

on State Theory

Kinetic theory is to describe reaction rates in physical properties of the reacting molecules. A network for doing so, that explicitly considers of the reacting molecules and how they collided in the 1930s, principally by Henry and reaction processes, known as transition state theory, is the foundation of modern kinetics and has provided an extraordinary framework for understanding how enzyme reactions.

State

bimolecular elementary reaction involving A, B, and C:

\[ A + B + C \rightarrow A + B + C \]

C: approach the diatomic molecule at some point in the reaction, a high-energy complex is presented as A⋯B⋯C exists in -B covalent bond is in the process of breaking -C bond is in the process of forming.

Consider the simplest example of this reaction: a hydrogen atom with diatomic hydrogen (H₂) to another molecule and a different hydrogen atom:

\[ \text{H}_2 + \text{H}_2 + \text{H}_2 \rightarrow \text{H}_2 + \text{H}_2 + \text{H}_2 \]

energy of this triatomic system as a function positions of its component atoms is plotted in and b. Its shape is of two long and deep valleys coordinate axes with sheer walls rising axes and less steep ones rising towards a plateau coordinates are large (the region of point b). The region joined by a pass or saddle near the origin of point c. The minimum energy configuration H₂ molecule and an isolated atom, that is, with one large and the other at the H₂ covalent bond points a (the reactants) and d (the products). Collision, the reactants generally approach one little deviation from the minimum energy way (line a→c→d) because other trajectories much greater energy. As the atom and molecule together, they increasingly repel one another (in a trivalent energy) and therefore usually fly away, the system has sufficient kinetic energy to coalesce, it will cause the covalent bond of the H₂ molecule to weaken until ultimately, if the system reaches the saddle point (point c), there is an equal probability that either the reaction will occur or that the system will decompose back to its reactants. Therefore, at this saddle point, the system is said to be at its transition state and hence to be an activated complex. Moreover, since the concentration of the activated complex is small, the decomposition of the activated complex is postulated to be the rate-determining process of this reaction.

The minimum energy pathway of a reaction is known as its reaction coordinate. Figure 13-4a, which is called a transition state diagram or a reaction coordinate diagram, shows the potential energy of the H + H₂ system along the reaction coordinate (line a→c→d in Fig. 13-3). It can be seen that the transition state is the point of highest energy on the reaction coordinate. If the atoms in the triatomic system are of different types, as is diagrammed in Fig. 13-4b, the tran-