1. Enzyme binds with the substrate

2. ES Concentration Increases

3. ES concentration will reach stable point and remain there until the reaction is nearly complete

‣ The "pre" steady state only lasts tenths to hundredths of seconds

   ‣ We assume the entire reaction takes place under this steady state condition

‣ Because ES is a constant we can assume that the rate of formation of ES equals the rate of ES dissociation plus the rate of conversion of S to P
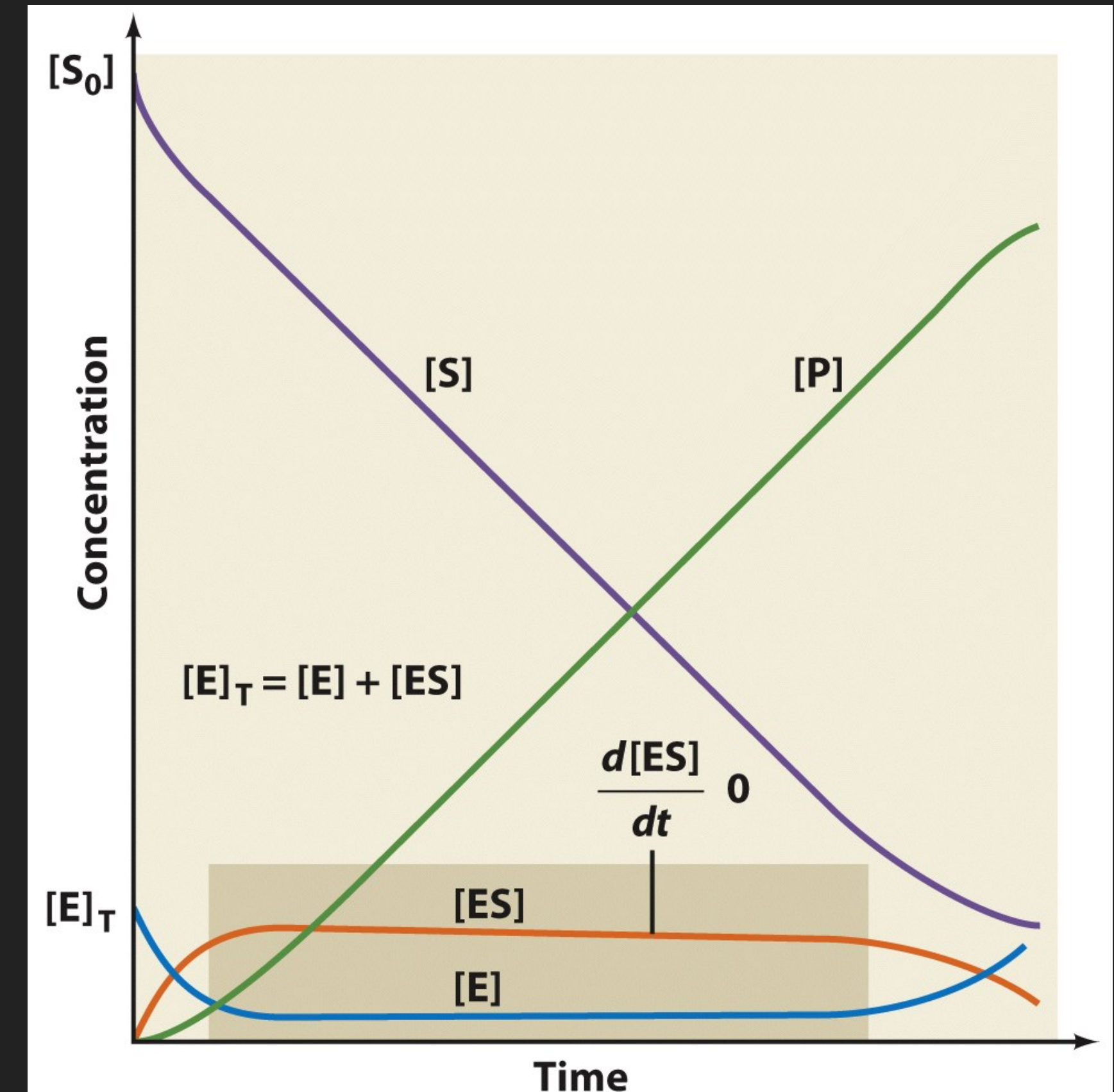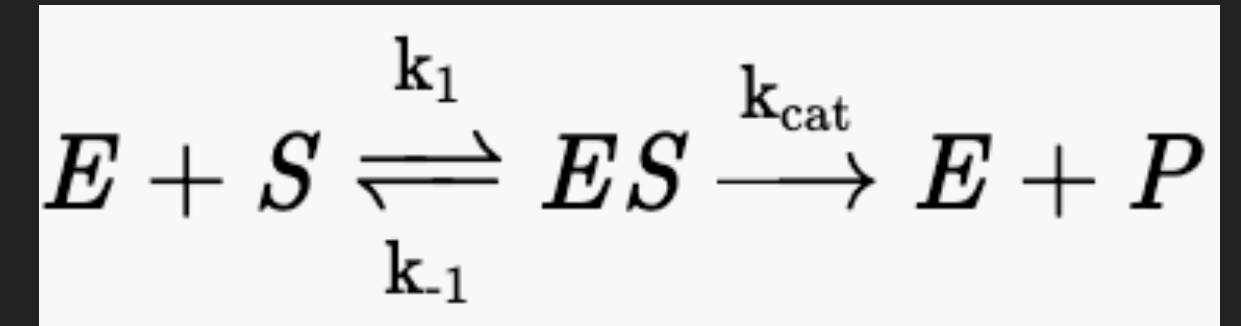

Figure 12-2
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$$E + S \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} ES \xrightarrow{k_{cat}} E + P$$

‣ Using the initial rate assumptions in the above reaction , assume:

  ‣ Conversion of ES to E+P = 1st Order Reaction that depends solely upon the rate constant and the concentration of [ES]

‣ Assume that the concentration of our substrate is much greater that that of our enzyme.

  ‣ [Substrate] >>> [Enzyme]

  ‣ Otherwise, the reaction would quickly slow or only work at half capacity from the beginning.