

Kinetics Worksheet #2

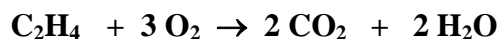
Ref: Mr. Dick Powell, Chemistry Teacher, Arlington, Texas, Personal Communication, July, 2003. Revised December, 2008.

1. Consider the combustion of H₂ in the following chemical reaction.



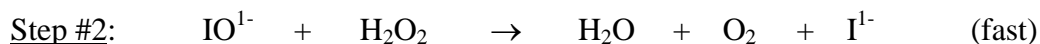
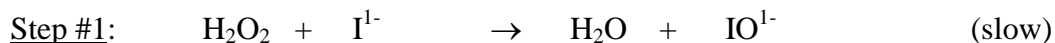
- (a) If H₂ is burning at a rate of 0.82 mol/s, what is the rate of consumption of oxygen?
- (b) If H₂ is burning at a rate of 0.82 mol/s, what would be the rate of formation of water vapor?

2. Consider the combustion of ethylene in the following chemical reaction.



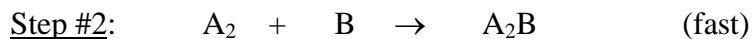
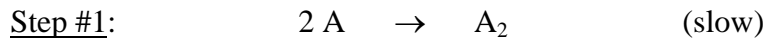
If the concentration of C₂H₄ is decreasing at a rate of 0.24 M/s, what are the rates of change in the concentrations of: oxygen, carbon dioxide, and water vapor?

3. Consider the overall reaction: $2 \text{H}_2\text{O}_2 \rightarrow \text{O}_2 + 2 \text{H}_2\text{O}$



- (a) What is the rate law for the overall reaction using the elementary steps above?
- (b) What is the reactive intermediate in the sequence shown above? _____

4. Consider the overall reaction: $2 A + B \rightarrow A_2B$



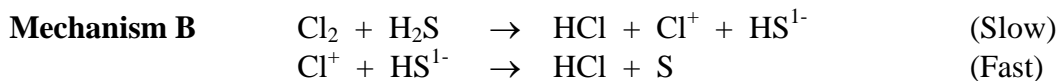
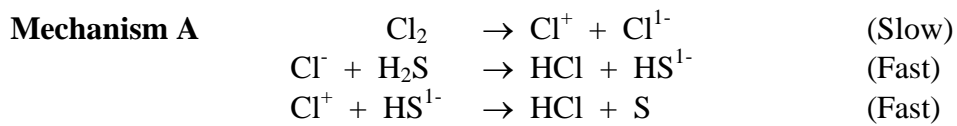
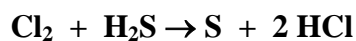
What is the rate law for the overall reaction using the elementary steps above?

5. Choose the correct molecularity for each of the following elementary step reactions.

Molecularity?



6. The rate equation for the reaction shown below is found to be $Rate = k[Cl_2][H_2S]$. Which of the following two proposed mechanisms is consistent with the observed rate law?



7. The generic reaction $A + B \rightarrow C$ obeys the following rate law: $Rate = k[A]^2[B]$.

(a) What happens to the *rate* if $[A]$ is doubled?

(b) What happens to the *rate constant* (k) if $[A]$ is doubled?