

AP Chemistry Daily Videos

5.9 Steady-Steady Approximation

Video #1

1. What do you do if an intermediate shows up in the rate law?
2. What are reversible reactions and what symbol is used to represent it?
3. What is equal in a reaction that has reached equilibrium?
4. Pause the video at 4:40 and attempt the problem, then evaluate how you did and identify any errors.

Determine the rate law expression predicted from the following proposed mechanism.

STEP 1:	$\text{O}_3(g) \xrightleftharpoons[k_{-1}]{k_1} \text{O}_2(g) + \text{O}(g)$	FAST
STEP 2:	$\text{O}_3(g) + \text{O}(g) \xrightarrow{k_2} 2\text{O}_2(g)$	SLOW
OVERALL:	$2\text{O}_3(g) \rightarrow 3\text{O}_2(g)$	

Video #2

1. Pause the video at 1:15 and attempt the problem, then evaluate how you did and identify any errors.

YOU DO IT – a mechanism has been proposed for the following reaction: $\text{Cl}_2(g) + \text{CHCl}_3(g) \rightarrow \text{HCl}(g) + \text{CCl}_4(g)$

STEP 1:	$\text{Cl}_2(g) \xrightleftharpoons[k_{-1}]{k_1} 2\text{Cl}(g)$	FAST
STEP 2:	$\text{Cl}(g) + \text{CHCl}_3(g) \xrightarrow{k_2} \text{CCl}_3(g) + \text{HCl}(g)$	SLOW
STEP 3:	$\text{Cl}(g) + \text{CCl}_3(g) \xrightarrow{k_3} \text{CCl}_4(g)$	FAST



- Does the overall balanced equation from the mechanism agree with the given stoichiometry? Justify your answer.
- Identify intermediate(s) and catalyst(s) in this mechanism.
- Determine the rate law expression predicted from this reaction.
- Write an expression for the observed rate constant in terms of rate constants from the proposed mechanism.