

Board Problems: Kinetics

Example #1

	$\text{F}_2 (\text{g})$	+	$2 \text{ClO}_2 (\text{g})$	\rightarrow	$2 \text{FClO}_2 (\text{g})$	
	$[\text{F}_2]$		$[\text{ClO}_2]$		<u>Initial Rate (M/sec)</u>	
Trial #1	0.10		0.010		1.2×10^{-3}	
Trial #2	0.10		0.040		4.8×10^{-3}	
Trial #3	0.20		0.010		2.4×10^{-3}	

How does changing the concentration of F_2 affect the rate of this reaction?

How does changing the concentration of ClO_2 affect the rate of this reaction?

What is the rate expression for this chemical reaction?

This rate is _____ order with respect to F_2 and _____ order with respect to ClO_2 .

Therefore, rate is _____ order overall.

Example #2



The reaction is _____ order in A, _____ order in B, and _____ order overall.

Write the rate expression when $[\text{A}] = 1.0 \text{ M}$ and $[\text{B}] = 1.0 \text{ M}$

Write the rate expression when $[\text{A}] = 2.0 \text{ M}$ and $[\text{B}] = 1.0 \text{ M}$

Write the rate expression when $[\text{A}] = 1.0 \text{ M}$ and $[\text{B}] = 2.0 \text{ M}$

Example #3

It's been determined that changing the concentration of A does not affect the rate of the reaction. The rate triples when the concentration of B is tripled.

What is the rate expression for this reaction?

We say that this reaction is _____ order in A and _____ order in B.

Example #4

	[NO]	[H ₂]	<u>Initial Rate (M/min)</u>
Trial #1	5.0×10^{-3}	2.0×10^{-3}	1.25×10^{-5}
Trial #2	10.0×10^{-3}	2.0×10^{-3}	5.0×10^{-5}
Trial #3	10.0×10^{-3}	4.0×10^{-3}	10.0×10^{-5}

What is the rate expression for this reaction?

Use the data from trial #1 to calculate the rate constant (k) for this reaction.

Use the data from trial #2 to calculate the rate constant (k) for this reaction.

Use the data from trial #3 to calculate the rate constant (k) for this reaction.

Big Idea: