Proposed mechanism for $2NO + Br_2 \rightarrow 2NOBr$:

step 1: $NO + Br_2 \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} NOBr_2$

step 2: $NOBr_2 + NO \xrightarrow{k_2} 2NOBr$

rate = $2k_1k_2[NO]^2[Br_2]/(k_{-1} + k_2[NO])$

If the first step is fast and the second step is slow,

1. rate = $k_{obs}[NO][Br_2]$
2. rate = $k_{obs}[Br_2]/[NO]$
3. rate = $k_{obs}[NO]^2[Br_2]$
4. rate = $k_{obs}[NO]^2/[Br_2]$

Today is the Last Clicker Competition Before the Championship!!!

Proposed mechanism for $2NO + Br_2 \rightarrow 2NOBr$:

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$\mathbf{rate = 2k_1k_2[NO]^2[Br_2]/(k_{-1} + k_2[NO])}$

If the first step is fast and the second step is slow,

38% 1. $rate = k_{obs}[NO][Br_2]$

17% 2. $rate = k_{obs}[Br_2]/[NO]$

42% 3. $rate = k_{obs}[NO]^2[Br_2]$

2% 4. $rate = k_{obs}[NO]^2/[Br_2]$

Today is the Last Clicker Competition Before the

Is factor A temperature dependent?

1. Yes, factor A increases as temperature increases.
2. Yes, factor A decreases as temperature increases.
3. No.

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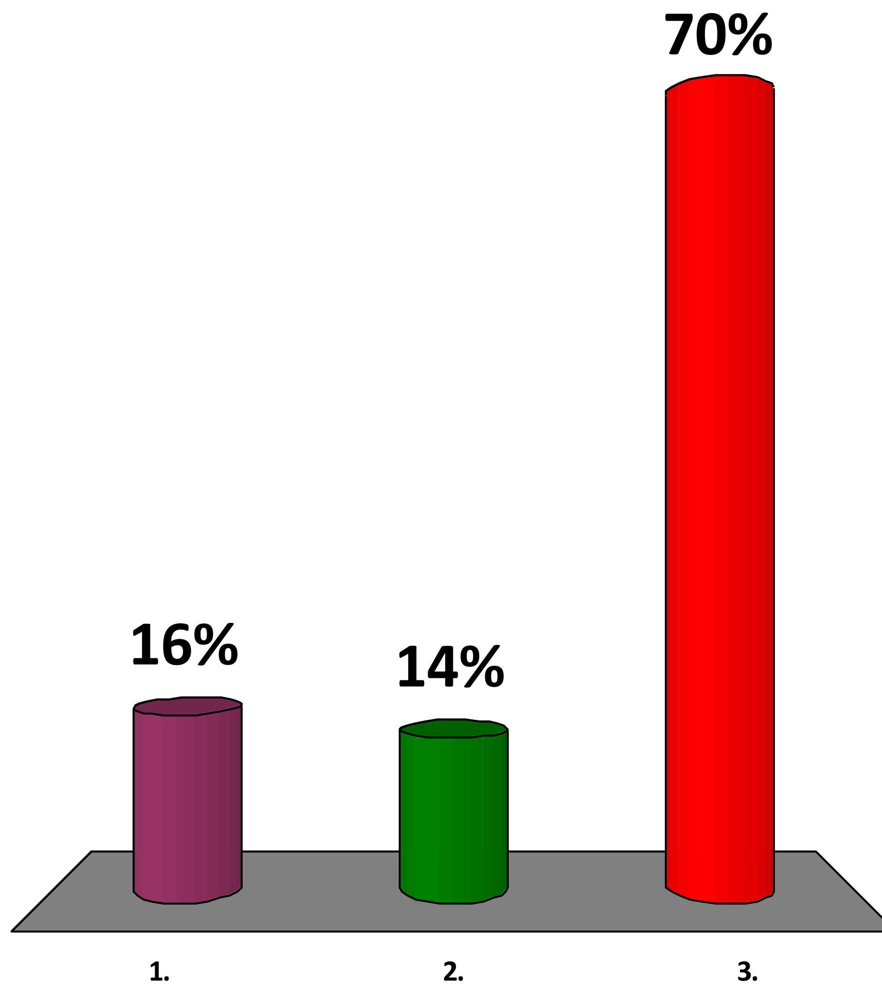
1. Yes, factor A increases as temperature increases.
2. Yes, factor A decreases as temperature increases.
3. No.

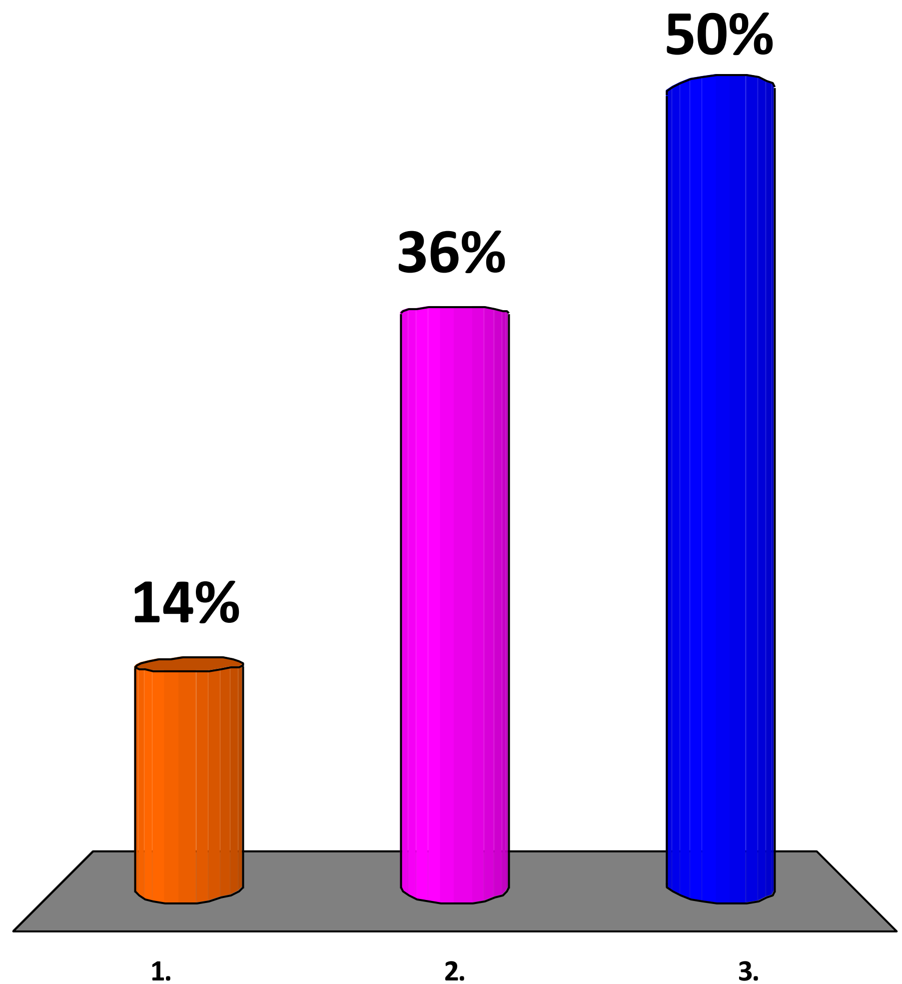


Is E_a temperature dependent?

1. Yes, E_a increases as temperature increases.
2. Yes, E_a decreases as temperature increases.
3. No.

Is E_a temperature dependent?

1. Yes, E_a increases as temperature increases.
2. Yes, E_a decreases as temperature increases.
3. No.



$$2NO + O_2 \rightarrow 2NO_2$$

step 1 (fast): $NO + NO \underset{k_{-1}}{\overset{k_1}{\rightleftarrows}} N_2O_2$

step 2 (slow): $N_2O_2 + O_2 \xrightarrow{k_2} 2NO_2$

K_1= ___________

$[N_2O_2]$ = _________

1. $K_1 = [N_2O_2\ ]/[NO]$	$[N_2O_2] = K_1[NO]$
2. $K_1 = [NO]^2/[N_2O_2\ ]$	$[N_2O_2] = [NO]^2/K_1$
3. $K_1 = [N_2O_2\ ]/[NO]^2$	$[N_2O_2] = K_1[NO]^2$
4. $K_1 = [N_2O_2\ ]$	$[N_2O_2] = K_1$

$$2NO + O_2 \rightarrow 2NO_2$$

step 1 (fast): $NO + NO \underset{k_{-1}}{\overset{k_1}{\rightleftarrows}} N_2O_2$

step 2 (slow): $N_2O_2 + O_2 \xrightarrow{k_2} 2NO_2$

K_1 = __________ **$[N_2O_2]$ = __________**

4%	1. $K_1 = [N_2O_2]/[NO]$	$[N_2O_2] = K_1[NO]$
30%	2. $K_1 = [NO]^2/[N_2O_2]$	$[N_2O_2] = [NO]^2/K_1$
64%	✓ 3. $K_1 = [N_2O_2]/[NO]^2$	$[N_2O_2] = K_1[NO]^2$
2%	4. $K_1 = [N_2O_2]$	$[N_2O_2] = K_1$

Increasing the temperature of an exothermic reaction:

1. Decreases K.
2. Increases K.
3. Has no effect on K, K is a constant.

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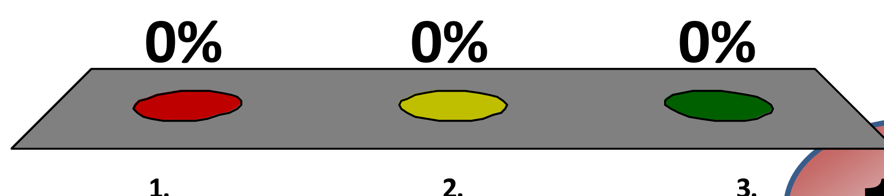

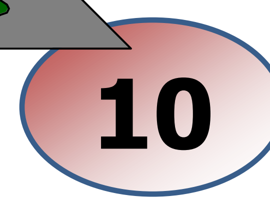

5.111 Principles of Chemical Science
Fall 2014