

Name: Key  
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Chemistry 12  
EQUILIBRIUM Lesson #4  
Le Chatelier's Principle

Le Chatelier's Principle STATES: If a closed system @ equilibrium is subjected to a change processes will occur to COUNTERACT that change.

IN OTHER WORDS: "Whatever We DO, NATURE tries to UNDO"

We will use the following chemical equation throughout this lesson:

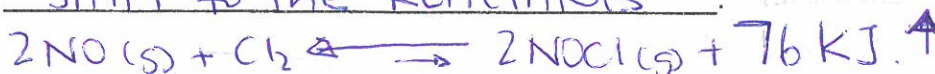


in a CLOSED container

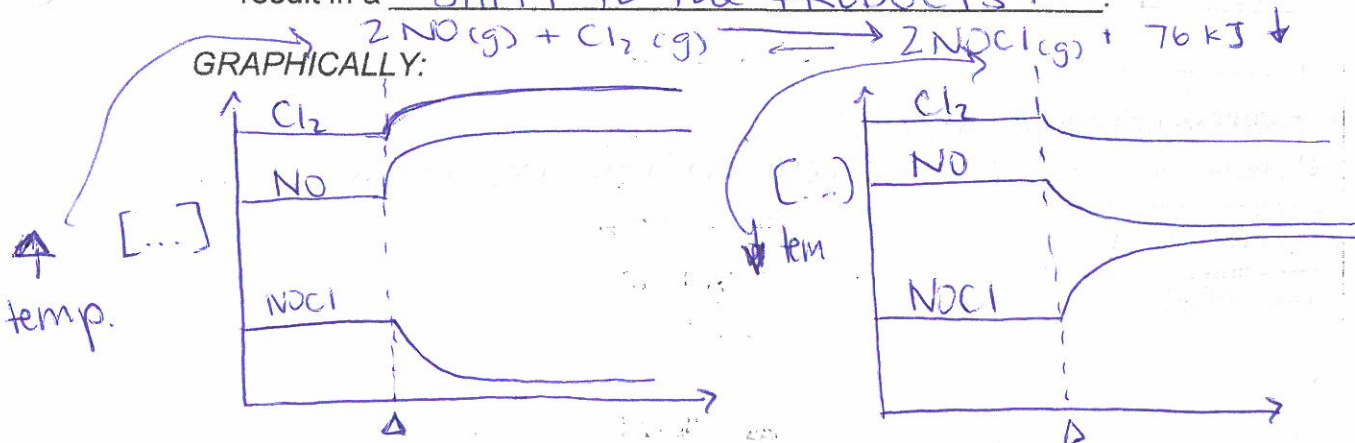
1. Effect of TEMPERATURE CHANGES:

When the temperature ↓ the rxn shift to produce more heat (side = heat term) when temp ↑ the rxn shifts to USE the extra heat. (away from heat term)

- a. AN INCREASE IN TEMPERATURE for the above equilibrium reaction will result in a SHIFT to the REACTANTS.



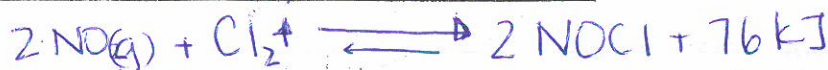
- b. A DECREASE IN TEMPERATURE for the above equilibrium reaction will result in a SHIFT to the PRODUCTS.



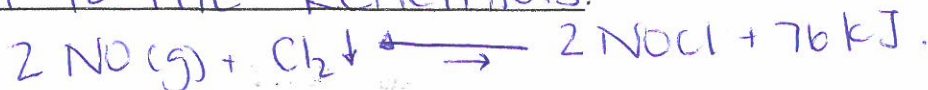
2. Effect of CONCENTRATION CHANGES:

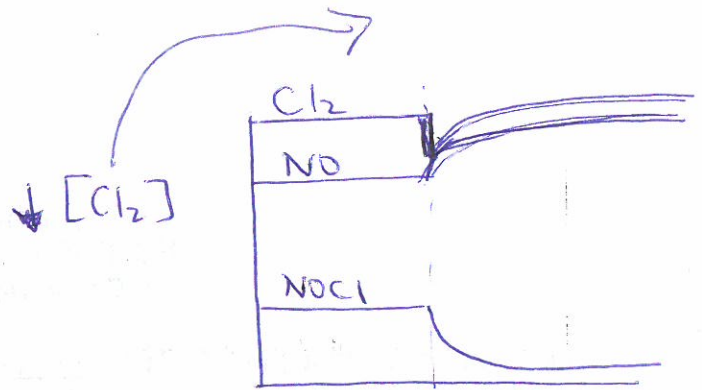
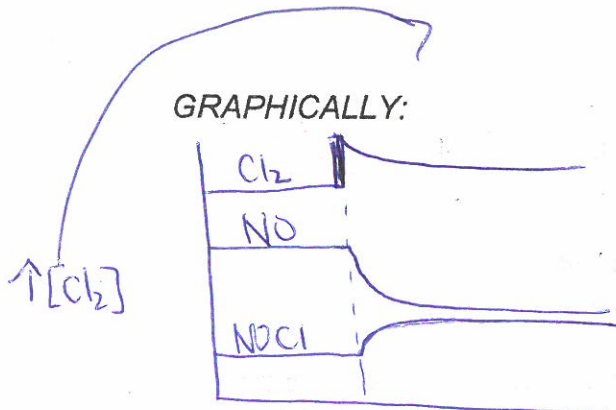
When the [ ] of one substance ↑ the rxn shifts to ↓ ~~Decrease~~ the added substance (and vice versa)

- a. AN INCREASE IN [Cl<sub>2</sub>] for the above equilibrium reaction will result in a SHIFT TO THE PRODUCTS.



- b. A DECREASE IN [Cl<sub>2</sub>] for the above equilibrium reaction will result in a SHIFT TO THE REACTANTS.



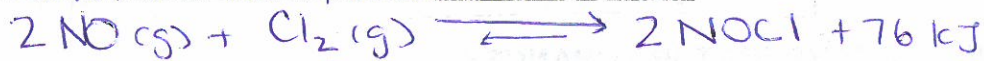


**3. Effect of PRESSURE CHANGES:**

a  $\downarrow$  in VOLUME  $\rightarrow$   $\uparrow$  pressure  $\therefore \uparrow [ ]$  of all gasses present  $\therefore$  will shift to a position of LOWER overall pressure.

a. AN INCREASE IN PRESSURE for the above equilibrium reaction will result in

a SHIFT TO PRODUCTS.



(fewer gas molecules on PRODUCTS)

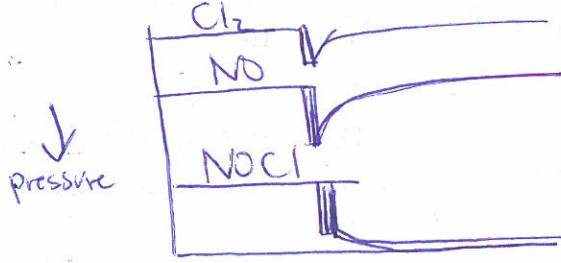
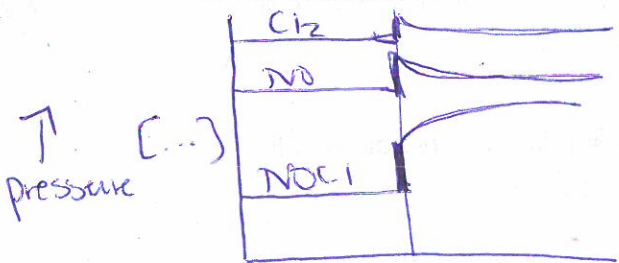
b. A DECREASE IN PRESSURE for the above equilibrium reaction will result in

a SHIFT TO REACTANTS.



(more gas molecules on REACTANTS)

GRAPHICALLY:



**4. Effect of ADDING A CATALYST:**

Adding a catalyst speeds up the rxn rate of both the forward + reverse rxns  $\therefore$  equilibrium is unaffected.

GRAPHICALLY:

