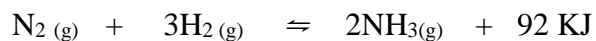
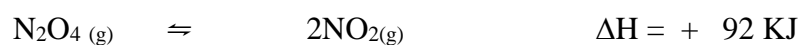


## Worksheet #2 LeChatelier's Principle

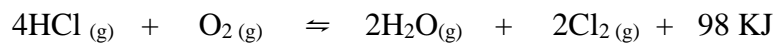
Describe the changes that occur after each stress is applied to the equilibrium.



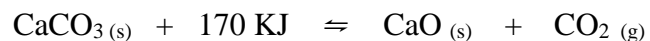
Stress	[N <sub>2</sub> ]	[H <sub>2</sub> ]	[NH <sub>3</sub> ]	Shifts Right or Left	Shifts to the Reac /Prod
1. [N <sub>2</sub> ] is increased	<b>increases</b>	<b>decreases</b>	<b>increases</b>	<b>right</b>	<b>products</b>
2. [H <sub>2</sub> ] is increased	<b>decreases</b>	<b>increases</b>	<b>increases</b>	<b>right</b>	<b>products</b>
3. [NH <sub>3</sub> ] is increased	<b>increases</b>	<b>increases</b>	<b>increases</b>	<b>left</b>	<b>reactants</b>
4. Temp is increase	<b>increases</b>	<b>increases</b>	<b>decreases</b>	<b>left</b>	<b>reactants</b>
5. [N <sub>2</sub> ] is decreased	<b>decreases</b>	<b>increases</b>	<b>decreases</b>	<b>left</b>	<b>reactants</b>
6. [H <sub>2</sub> ] is decreased	<b>increases</b>	<b>decreases</b>	<b>decreases</b>	<b>left</b>	<b>reactants</b>
7. [NH <sub>3</sub> ] is decreased	<b>decreases</b>	<b>decreases</b>	<b>decreases</b>	<b>right</b>	<b>products</b>
8. Temp is decreased	<b>decreases</b>	<b>decreases</b>	<b>increases</b>	<b>right</b>	<b>products</b>
9. A catalyst is added	<b>nochange</b>	<b>nochange</b>	<b>nochange</b>	<b>nochange</b>	<b>nochange</b>



Favor the Stress	Shifts		Shifts to	
	[N <sub>2</sub> O <sub>4</sub> ]	[NO <sub>2</sub> ]	Right or Left	Reactants or Products
1. [N <sub>2</sub> O <sub>4</sub> ] is increased	<b>increases</b>	<b>increases</b>	<b>right</b>	<b>products</b>
2. [NO <sub>2</sub> ] is increased	<b>increases</b>	<b>increases</b>	<b>left</b>	<b>reactants</b>
3. Temp is increased	<b>decreases</b>	<b>increases</b>	<b>right</b>	<b>products</b>
4. [N <sub>2</sub> O <sub>4</sub> ] is decreased	<b>decreases</b>	<b>decreases</b>	<b>left</b>	<b>reactants</b>
5. [H <sub>2</sub> ] is decreased	<b>nochange</b>	<b>nochange</b>	<b>nochange</b>	<b>nochange</b>
6. [NO <sub>2</sub> ] is decreased	<b>decreases</b>	<b>decreases</b>	<b>right</b>	<b>products</b>
7. Temp is decreased	<b>increases</b>	<b>decreases</b>	<b>left</b>	<b>reactants</b>



Favour the Stress	Shifts			Shifts to	
	[O <sub>2</sub> ]	[H <sub>2</sub> O]	[HCl]	Right or Left	Reactants or Products
1. [HCl] is increased	<b>decreases</b>	<b>increases</b>	<b>increases</b>	<b>right</b>	<b>products</b>
2. [H <sub>2</sub> O] is increased	<b>increases</b>	<b>increases</b>	<b>increases</b>	<b>left</b>	<b>reactants</b>
3. [O <sub>2</sub> ] is increased	<b>increases</b>	<b>increases</b>	<b>decreases</b>	<b>right</b>	<b>products</b>
4. Temp is increased	<b>increases</b>	<b>decreases</b>	<b>increases</b>	<b>left</b>	<b>reactants</b>
5. [H <sub>2</sub> O] is decreased	<b>decreases</b>	<b>decreases</b>	<b>decreases</b>	<b>right</b>	<b>products</b>
6. [HCl] is decreased	<b>increases</b>	<b>decreases</b>	<b>decreases</b>	<b>left</b>	<b>reactants</b>
7. [O <sub>2</sub> ] is decreased	<b>decreases</b>	<b>decreases</b>	<b>increases</b>	<b>left</b>	<b>reactants</b>
8. Temp is decreased	<b>decreases</b>	<b>increases</b>	<b>decreases</b>	<b>right</b>	<b>products</b>
9. A catalyst is added	<b>nochange</b>	<b>nochange</b>	<b>nochange</b>	<b>nochange</b>	<b>nochange</b>



Note : Adding solids or liquids and removing solids or liquids does not shift the equilibrium. This is because you cannot change the concentration of a pure liquid or solid as they are 100% pure. It is only a concentration change that will change the # of collisions and hence shift the equilibrium.

Stress	[CO <sub>2</sub> ]	Shifts Right or Left	Shifts to Favor the Reactants or Products
1. CaCO <sub>3</sub> is added	<b>nochanges</b>	<b>nochanges</b>	<b>nochanges</b>
2. CaO is added	<b>nochanges</b>	<b>nochanges</b>	<b>nochanges</b>
3. CO <sub>2</sub> is added	<b>increases</b>	<b>left</b>	<b>reactants</b>
4. Temp is decreased	<b>decreases</b>	<b>left</b>	<b>reactants</b>
5. A catalyst is added	<b>nochanges</b>	<b>nochanges</b>	<b>nochanges</b>
6. [CO <sub>2</sub> ] is decreased	<b>decreases</b>	<b>right</b>	<b>products</b>
7. Temp is increased	<b>increases</b>	<b>right</b>	<b>products</b>
8. CaO is removed	<b>nochanges</b>	<b>nochanges</b>	<b>nochanges</b>