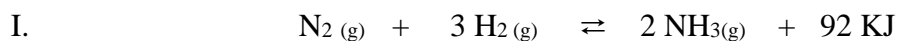


Learning Goal B3: Apply Le Chatelier’s principle to the shifting of equilibrium.

Problem Set A: Le Châtelier’s Principle

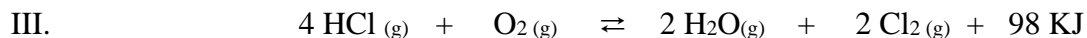
Describe the changes that occur after each stress is applied to the equilibrium.



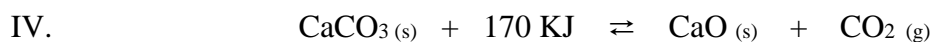
Stress	[N ₂]	[H ₂]	[NH ₃]	Shifts Right or Left	Shifts to the Reactants or Products
1. [N ₂] is increased	_____	_____	_____	_____	_____
2. [H ₂] is increased	_____	_____	_____	_____	_____
3. [NH ₃] is increased	_____	_____	_____	_____	_____
4. Temp is increased	_____	_____	_____	_____	_____
5. [N ₂] is decreased	_____	_____	_____	_____	_____
6. [H ₂] is decreased	_____	_____	_____	_____	_____
7. [NH ₃] is decreased	_____	_____	_____	_____	_____
8. Temp is decreased	_____	_____	_____	_____	_____
9. A catalyst is added	_____	_____	_____	_____	_____



Stress	[N ₂ O ₄]	[NO ₂]	Shifts Right or Left	Shifts to Favour the Reactants or Products
1. [N ₂ O ₄] is increased	_____	_____	_____	_____
2. [NO ₂] is increased	_____	_____	_____	_____
3. Temp is increased	_____	_____	_____	_____
4. [N ₂ O ₄] is decreased	_____	_____	_____	_____
5. Ne is added	_____	_____	_____	_____
6. [NO ₂] is decreased	_____	_____	_____	_____
7. Temp is decreased	_____	_____	_____	_____



Stress	[O ₂]	[H ₂ O]	[HCl]	Shifts Right or Left	Shifts to Favour the Reactants or Products
1. [HCl] is increased	_____	_____	_____	_____	_____
2. [H ₂ O] is increased	_____	_____	_____	_____	_____
3. [O ₂] is increased	_____	_____	_____	_____	_____
4. Temp is increased	_____	_____	_____	_____	_____
5. [H ₂ O] is decreased	_____	_____	_____	_____	_____
6. [HCl] is decreased	_____	_____	_____	_____	_____
7. [O ₂] is decreased	_____	_____	_____	_____	_____
8. Temp is decreased	_____	_____	_____	_____	_____
9. A catalyst is added	_____	_____	_____	_____	_____



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 ₂]	Shifts Right or Left	Shifts to Favor the Reactants or Products
1. CaCO ₃ is added	_____	_____	_____
2. CaO is added	_____	_____	_____
3. CO ₂ is added	_____	_____	_____
4. Temp is decreased	_____	_____	_____
5. A catalyst is added	_____	_____	_____
6. [CO ₂] is decreased	_____	_____	_____
7. Temp is increased	_____	_____	_____
8. CaO is removed	_____	_____	_____