

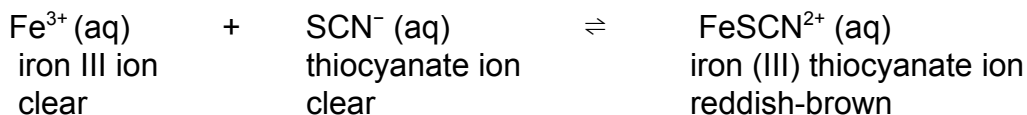
Altering Equilibrium

Le Châtelier's Principle:

When an equilibrium system is subjected to a change, the system adjusts in a way that opposes the change.

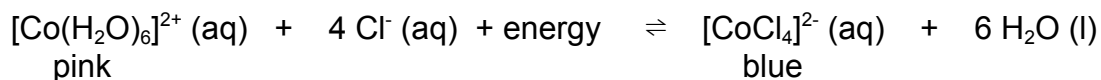


THE EFFECT OF CONCENTRATION CHANGES ON REACTIONS AT EQUILIBRIUM



DISH	CHANGE	OBSERVATION	EXPLANATION
1	None	Reddish-Brown Colour	Control
2	Increase [SCN ⁻]		
3	Increase [Fe ³⁺]		
4	Decrease [Fe ³⁺] by adding K ₂ HPO ₄		

THE EFFECT OF TEMPERATURE CHANGES ON REACTIONS AT EQUILIBRIUM



TUBE	CHANGE	OBSERVATION	EXPLANATION
1	None		Control
2	Increase Temperature		
3	Decrease Temperature		

EFFECT OF PRESSURE AND VOLUME CHANGES

- If volume is decreased or pressure is increased in an equilibrium system, the system will react by reducing the pressure.
- If a reaction involves gases, this will favour the direction that produces the fewest gas molecules.
- Reactions involving solids/liquids are not significantly affected by changes in volume and pressure.



Change: Result:
 $\uparrow P$ (or $\downarrow V$)



Change: Result:
 $\downarrow P$ (or $\uparrow V$)

EFFECT OF A CATALYST

A catalyst lowers the activation energy and speeds up both the forward and reverse reaction.

Equilibrium will be obtained earlier but the catalyst will not affect the concentration of reactants or products at equilibrium.