

# OCR (B) Chemistry A-Level

## Cl<sub>2</sub> - Equilibrium

### Flashcards

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# What is the equilibrium constant?



## What is the equilibrium constant?

- The equilibrium constant tells you the position of equilibrium of a reaction.
- The magnitude indicates whether there are more reactants or products in the system.



How does temperature affect the magnitude of the equilibrium constant?



## How does temperature affect the magnitude of the equilibrium constant?

- If the forward reaction is **exothermic**, increasing the temperature shifts the position of equilibrium to the **left** so  $k_c$  decreases.
- If the forward reaction is **endothermic**, increasing the temperature shifts the equilibrium to the **right** so  $k_c$  increases.



How does pressure affect the magnitude of the equilibrium constant?



# How does pressure affect the magnitude of the equilibrium constant?

$K_c$  remains the same:

- For example, doubling the pressure will double both the partial pressures and concentrations of the species on both sides of the equation.
- The system is no longer in equilibrium so partial pressures of reactants and products must change to keep  $K_c$  the same.
- New equilibrium position will be reached whereby  $K_c$  is restored (as ratio of  $K_c$  expression is the same as before)



Does the addition of a catalyst affect the position of equilibrium?





Does the addition of a catalyst affect the position of equilibrium?

- No, a catalyst doesn't affect the position of equilibrium.
- It does however increase the rate of both the forward and reverse reactions.



Why may temperatures used in industry be different than expected?



# Why may temperatures used in industry be different than expected?

A low temperature may give a greater yield for a particular product in a reversible reaction, however this will result in a slow rate of reaction and so a higher temperature may be used to strike a balance between yield and rate.



Why may the pressure used in industry be different than expected?



Why may the pressure used in industry be different than expected?

A high pressure may give a greater yield for a particular product in a reversible reaction, however high pressures can be dangerous and expensive and so a lower pressure may be used.



# What is homogeneous equilibria?



# What is homogeneous equilibria?

A homogeneous equilibrium contains species that are all the same state/phase.



# What is heterogeneous equilibria?





# What is heterogeneous equilibria?

A heterogeneous equilibrium contains reactants and products that are in different states/phases.



# How do you calculate $K_c$ ?



How do you calculate  $K_c$ ?



$$K_c = \frac{[NH_3]^2}{[N_2][H_2]^3}$$

The product of the concentrations of products to the power of their balancing number divided by the product of the concentrations of the reactants to the power of their balancing number will equal the equilibrium constant.

