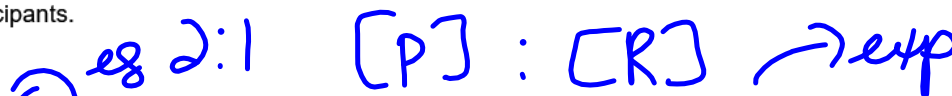


The Equilibrium Constant Keq or Kc *(doesn't change)*

There is a mathematical relationship that exists between the concentration of the reactants and products once equilibrium has reached that is independent of the initial concentrations of the participants.



It is the ratio of the product concentrations to the reactant concentrations raised to their coefficients.

This ratio DOES NOT VARY for the same reaction at the same temperature conditions.

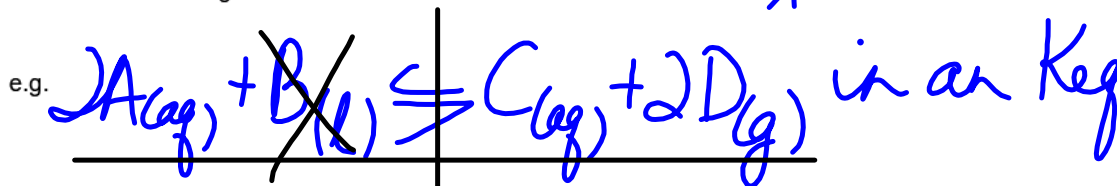
compress

Only GASES and AQUEOUS solutions are included in Keq.

*

You CANNOT change the concentration of a SOLID or a LIQUID!!!!

* no Sol/L



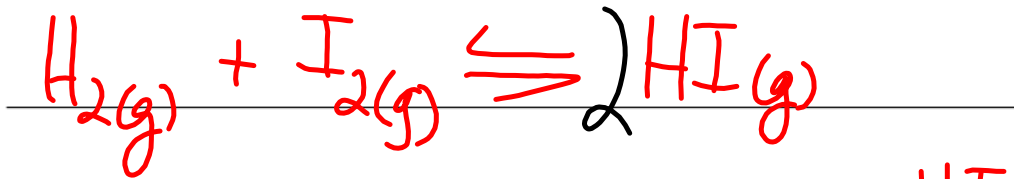
Where A and B are *R* and C and D are *P*.

$$K_{eq} = \frac{[P]}{[R]}$$

$$K_{eq} = \frac{[C]^1 [D]^2}{[A]^2} \left. \vphantom{K_{eq}} \right\} \begin{matrix} K_{eq} \\ \text{express} \end{matrix}$$

calc = #

For the reaction between hydrogen and iodine ^{vapour} gas to produce hydrogen iodide ^{di iodide}:



The equilibrium constant expression is:

$$K_{eq} = \frac{[\text{HI}]^2}{[\text{H}_2][\text{I}_2]}$$

HI(aq)
hydroiodic
A

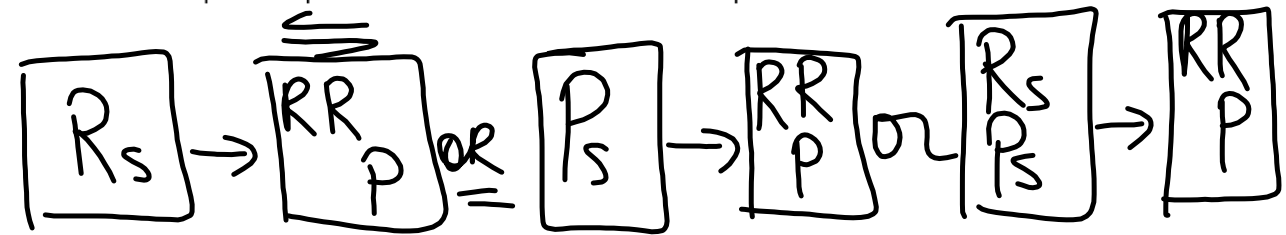
HCl(aq)

At equilibrium the rate of the forward = the rate of the reverse AND the concentrations of the R and P remain constant.

The equilibrium position i.e. more R or more P depends on the reaction itself AND the temperature you do the reaction at.

30% : 70%

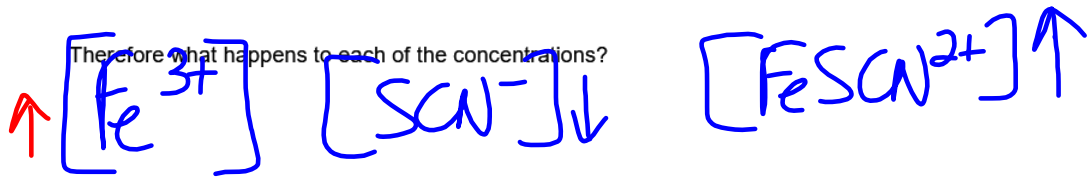
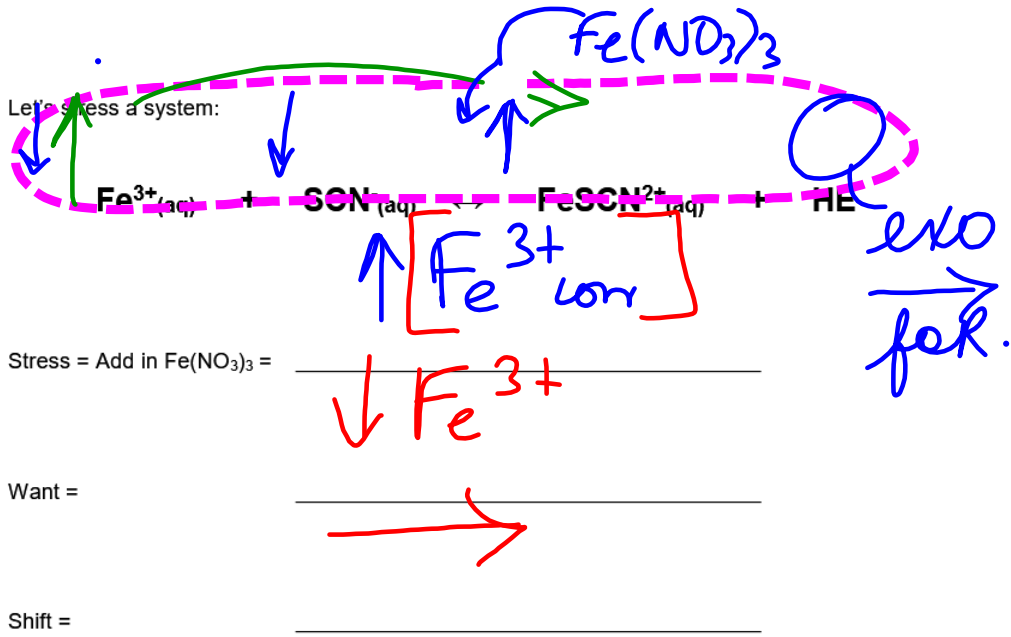
It DOES NOT MATTER IF you start with only R or only P or a combination of R and P—the same equilibrium position will be reached at the same temperature!!



if the T is the same!

If you change the temperature all bets are off!! Changing the temperature shifts the equilibrium permanently forward or reverse and the ratio will change as a result.

A change in temperature means a change of the numerical value of K_{eq} i.e. the ratio of P to R changes!



But the Ratio i.e. the $K_{eq} =$

$$K_{eq} = \frac{\uparrow [\text{FeSCN}^{2+}]}{\uparrow [\text{Fe}^{3+}] \downarrow [\text{SCN}^{-}]}$$

every $[\]$ has changed!

BUT: the Ratio stays the same!

- So if the ratio were 30% : 70% before the stress then after the stress the ratio is 30% : 70%