**Gibbs Free Energy**

Calculating ∆Stotal is one way of determining reaction feasibility. ∆G, Gibbs free energy change is another method.

Gibbs free energy change is calculated using the following equation

 ∆G = ∆H - T∆S (Where ∆S is ∆Ssys)

If ∆G is negative the reaction is feasible. If ∆G is positive the reaction is not feasible.

E.g. Calculate ∆G for the following reaction at 298K and discuss the feasibility of the reaction. Use the data in the table.

|  |  |
| --- | --- |
| **Substance** | **Sθ J K-1 mol-1** |
| CaCO3(s) | 92.9 |
| CO2(g) | 213.7 |
| CaO(s) | 39.8 |

 CaCO3(s) 🡪 CaO(s) + CO2(g) ∆H = +178 kJmol-1

Consider the equation

∆G = ∆H - T∆S

Is there any way to make the above reaction feasible?

To calculate the temperature at which a reaction becomes feasible we rearrange the equation and make ∆G = 0.

E.g. Calculate the temperature at which the following reaction becomes feasible.

 CaCO3(s) 🡪 CaO(s) + CO2(g)



