

Use the data sheet to calculate Delta H, Delta S and Delta G at 25 C for each of the following reactions.

In each case show that Delta G = Delta H - T Delta S



DATA SHEET

Question 9

| Substance | S° (J/mol-K) |
|---------------|---------------------|
| $N_2H_4(g)$ | 238.5 |
| $H_2(g)$ | 130.58 |
| $NH_3(g)$ | 192.5 |
| $Al(s)$ | 28.32 |
| $Cl_2(g)$ | 222.96 |
| $AlCl_3(s)$ | 109.3 |
| $Mg(OH)_2(s)$ | 63.24 |
| $HCl(g)$ | 186.69 |
| $MgCl_2(s)$ | 89.6 |
| $H_2O(l)$ | 69.91 |
| $CH_4(g)$ | 186.3 |
| $C_2H_6(g)$ | 229.5 |
| $H_2(g)$ | 130.58 |

Question 10

| Substance | ΔH_f° (kJ/mol) | S° (J/mol-K) | ΔG_f° (kJ/mol) |
|----------------------|-----------------------------|---------------------|-----------------------------|
| $Nl(s)$ | 0 | 29.9 | 0 |
| $Cl_2(g)$ | 0 | 222.96 | 0 |
| $NiCl_2(s)$ | -305.3 | 97.65 | -259.0 |
| $CaCO_3(s, calcite)$ | -1207.1 | 92.88 | -1128.76 |
| $CaO(s)$ | -635.5 | 39.75 | -604.17 |
| $CO_2(g)$ | -393.5 | 213.6 | -394.4 |
| $CH_3OH(l)$ | -238.6 | 126.8 | -166.23 |
| $O_2(g)$ | 0 | 205.0 | 0 |
| $H_2O(l)$ | -285.83 | 69.91 | -237.13 |