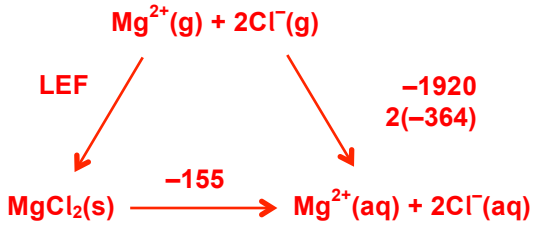
THERMODYNAMICS (B)

1 The enthalpy of solution of magnesium chloride is –155 kJ mol^{-1}. The hydration enthalpies of magnesium and chloride ions are –1920 and –364 kJ mol^{-1} respectively. Calculate the lattice enthalpy of formation of magnesium chloride.



LEF – 155 = –1920 + 2(– 364)

LEF = –1920 + 2(– 364) + 155

= – 2493 kJ mol^{-1}

2 Write a chemical equation that represents each of the following enthalpy changes.

a enthalpy of combustion of Na(s) — $Na(s) + \frac{1}{4}O_2(g) \rightarrow \frac{1}{2}Na_2O(s)$

b enthalpy of formation of $AlBr_3(s)$ — $Al(s) + \frac{3}{2}Br_2(l) \rightarrow AlBr_3(s)$

c enthalpy of atomisation of $I_2(s)$ — $\frac{1}{2}I_2(s) \rightarrow I(g)$

d lattice enthalpy of formation of $AlBr_3(s)$ — $Al^{3+}(g) + 3Br^-(g) \rightarrow AlBr_3(s)$

e lattice enthalpy of dissociation of $K_2O(s)$ — $K_2O(s) \rightarrow 2K^+(g) + O^{2-}(g)$

f bond dissociation enthalpy for C=O in CO_2 — $\frac{1}{2}CO_2(g) \rightarrow \frac{1}{2}C(g) + O(g)$

g 3rd ionisation enthalpy of gallium — $Ga^{2+}(g) \rightarrow Ga^{3+}(g) + e^-$

h 1st electron affinity of bromine — $Br(g) + e^- \rightarrow Br^-(g)$