Answer on Question #79214, Chemistry/General Chemistry
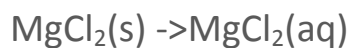
Use enthalpies of formation to determine the ΔH reaction for the reaction
MgCl2(s)→MgCl2(aq).

Solution

$MgCl_2(s) -> MgCl_2(aq)$

ΔH rxn= Σn $_p$×ΔH$_f^o$ (products) – Σ n$_r$×ΔH$_f^o$ (reactants)

ΔH$_f^o$ [MgCl$_2$ (s)] = -641.8 kJ/mol

Though there is no table value for ΔH$_f^o$ [MgCl$_2$ (aq)] we can calculate this value as there are table values for magnesium ion aq (ΔH $_f^o$ [Mg $^{2+}$ (aq)]=-466.85 kJ/mol and two chloride ions aq ΔH $_f^o$ [Cl $^-$(aq)]=-167.2 kJ/mol

ΔH $_f^o$ [MgCl $_2$ (aq)] = -466.85 kJ/mol +2×(-167.2 kJ/mol)= - 801.25 kJ/mol

So ΔH$_{rxn}$ = ΔH $_f^o$ [MgCl $_2$ (aq)] - ΔH $_f^o$ [MgCl $_2$ (s)] = -801.25 –(-641.8)= -159.45 kJ/mol

Answer: B. ΔH$_{rxn}$ =- 159.45 kJ/mol