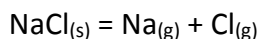


Question #59759, Chemistry / General chemistry

Explain what is meant by the enthalpy of solution, enthalpy of hydration and lattice enthalpy with respect to ionic salts using NaCl as an example for each.

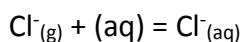
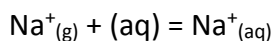
Answer

The heat energy needed to break up 1 mole of the crystal lattice is the lattice dissociation enthalpy. For NaCl it's describe by such formal equation:



The hydration enthalpy is the enthalpy change when 1 mole of gaseous ions dissolve in sufficient water to give an infinitely dilute solution. Hydration enthalpies are always negative.

For NaCl it's describe by such formal equation:



The enthalpy change of solution is the enthalpy change when 1 mole of an ionic substance dissolves in water to give a solution of infinite dilution.

So, when 1 mole of sodium chloride crystals are dissolved in an excess of water, the enthalpy change of solution is found to be +3.9 kJ mol⁻¹. The change is slightly endothermic, and so the temperature of the solution will be slightly lower than that of the original water.

Resulting equation is

