Answer on Question #71167 – Chemistry – General Chemistry

6) There is something called the lattice energy. Is that the energy needed to break the ionic bound between, in this case Mg^{2+}...O ? in a $MgSO_4$ dissolved in distilled water?
7) How do I calculate how much energy i need to break all the Mg^{2+}....O bounds in a 100 ml solution of $MgSO_4$ at 20 degrees.
8) Would the calculation in 7) be different if i used $MgSO_4 \cdot 7H_2O$ or $MgSO_4 \cdot 6H_2O$ in the saturated solution.

Solution:

Lattice energy is the energy required to break apart an ionic solid and convert its component atoms into gaseous ions , in this case Mg^{2+}...SO_4^{2-}
You can can use a Hess's Law cycle (in this case called a Born-Haber cycle) involving enthalpy changes which can be measured.
Enthalpy of lattice formation (lattice energy) of $MgSO_4$ = -2833 $kJ \cdot mol^{-1}$
Will be no differ if you use $MgSO_4 \cdot 7H_2O$ or $MgSO_4 \cdot 6H_2O$, because crystallized water dissolve in solution. For calculations of the lattice energy you need only $MgSO_4$