Enthalpy of aqution, $\Delta_{aq}H$, is the enthalpy change when a mole of ion pairs, initially in the gas phase, so far apart they no longer interact with one another electrically, is placed in liquid water. Enthalpy of aqution ...

33% 1. is always positive
33% 2. is always negative
33% 3. can be positive or negative, depending on the ionic solid

Lattice enthalpy, $\Delta_{latt}H$

Write the chemical equation whose enthalpy change is the lattice enthalpy of KCl, $\Delta_{latt}H$. Be sure to include the states of all.

Lattice enthalpy, $\Delta_{latt}H$

Create the enthalpy diagram corresponding to the chemical equation whose enthalpy change is the lattice enthalpy of KCl, $\Delta_{latt}H$. Be sure to show visually whether the process is endothermic or exothermic.
Enthalpy of aquation, \( \Delta_{aq}H \), is the enthalpy change when a mole of ion pairs, initially in the gas phase, so far apart they no longer interact with one another electrically, is placed in liquid water. Enthalpy of aquation...

1. is always positive
2. is always negative
3. can be positive or negative, depending on the ionic solid

Enthalpy of solution, \( \Delta_{sol}H \), is the enthalpy change when a mole of an ionic solid dissolves in water. Enthalpy of solution...

1. is always positive
2. is always negative
3. can be positive or negative, depending on the ionic solid

Write the chemical equation whose enthalpy change is the enthalpy of aquation of KCl, \( \Delta_{aq}H \). Be sure to include the states of all species.

Create the enthalpy diagram corresponding to the chemical equation whose enthalpy change is the enthalpy of aquation of KCl, \( \Delta_{aq}H \). Be sure to show visually whether the process is endothermic or exothermic.
Enthalpy change of solution, $\Delta_{\text{sol}} H$

Write the chemical equation whose enthalpy change is the enthalpy change of solution of KCl, $\Delta_{\text{sol}} H$. Be sure to include the states of all species.

Enthalpy change of solution, $\Delta_{\text{sol}} H$

Create the enthalpy diagram corresponding to the chemical equation whose enthalpy change is the enthalpy change of solution of KCl, $\Delta_{\text{sol}} H$. Be sure to show visually whether the process is endothermic or exothermic.

Enthalpy change of solution, $\Delta_{\text{sol}} H$

Combine the three enthalpy diagrams that you have created to visually related the lattice enthalpy, enthalpy of aqauation and the enthalpy change of solution. Be sure to include the states of all species.

Enthalpy change of solution, $\Delta_{\text{sol}} H$

When KF(s) is dissolved in water in a beaker, the beaker becomes warm. Sketch the enthalpy change diagram for $\Delta_{\text{sol}} H$ in terms of $\Delta_{\text{latt}} H$ and $\Delta_{\text{aq}} H$. 
When ammonium nitrate dissolves in water in a beaker, the beaker feels cold. The means that, relative to the magnitude of the enthalpy change of aquation, |ΔaqH|, the magnitude of the lattice enthalpy, |ΔlattH| is ...

25% 1. larger
25% 2. the same
25% 3. smaller
25% 4. Further information required

Lattice enthalpy, ΔlattH

Key idea: Electrical attraction (Coulomb’s law) between oppositely charged ions in lattice

Energy \( \propto - \frac{q_a q}{\text{separation}} \)

The larger charges the greater lattice enthalpy

MgS > NaCl
CaCO3 > KNO3

Predicting relative values of ΔlattH and ΔaqH

Lattice enthalpy, ΔlattH

Key idea: Electrical attraction (Coulomb’s law) between oppositely charged ions in lattice

Energy \( \propto - \frac{q_a q}{\text{separation}} \)

The smaller ion size, the smaller the separation and so ...

the greater lattice enthalpy

NaF > NaCl
LiCl > NaCl