

27 Solubility energetics – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	Write it 3 times (English)
enthalpy change of solution	_____
enthalpy change of hydration	_____
solubility	_____

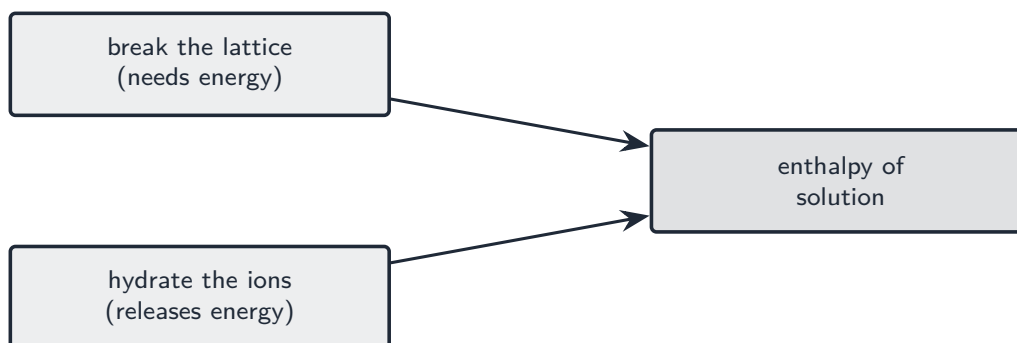
Recall

When an ionic solid dissolves, two energy changes compete. Their balance decides how soluble it is.

New ideas

Read these first, then do the Practice.

■ 1 Enthalpy of solution



The **enthalpy change of solution** is the sum of breaking the lattice (needs the lattice energy) and the **enthalpy change of hydration** (water surrounds the ions, releasing energy).

■ 2 Opposite trends



Down the group, the **solubility** of the hydroxides *increases* but the sulfates *decreases* – because the two energy terms shrink at different rates.

Watch out: the enthalpy of solution = lattice-breaking (energy *in*) + hydration (energy *out*) – the two compete. The hydroxide and sulfate trends go *opposite* ways because the two terms change at different rates down the group.

Practice

Try these in order.

27.6 What two energy changes compete when a solid dissolves? [2]

27.7 Which step *needs* energy? [1]

27.8 Which step *releases* energy? [1]

27.9 Down Group 2, do the *hydroxides* get more or less soluble? [1]

27.10 Down Group 2, do the *sulfates* get more or less soluble? [1]

27.11 Challenge. Dissolving a solid involves breaking the lattice (endothermic) and hydrating the ions (exothermic). Explain what makes the *overall* enthalpy of solution exothermic. [2]
