23 Born-Haber cycles – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)
Born–Haber cycle	玻恩哈伯循环	
smaller ionic radius	离子半径	

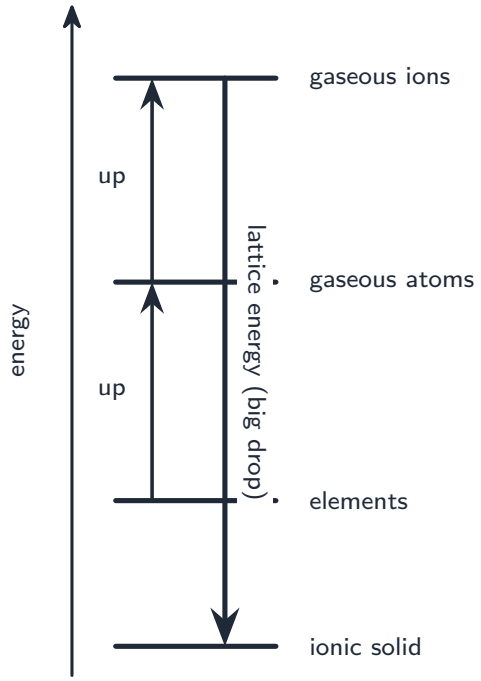
Recall

A **Born–Haber cycle** 玻恩哈伯循环 links these enthalpy changes so you can find any unknown one.

New ideas

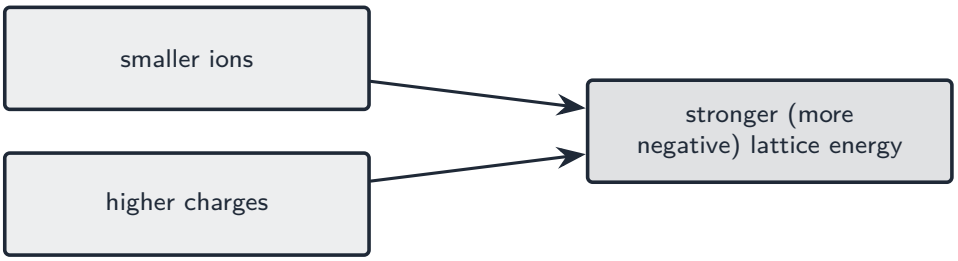
Read these first, then do the Practice.

- **1 The cycle**



Going *up* costs energy (atomisation, ionisation); coming *down* releases it (electron affinity, and the large lattice energy). Using Hess's law, you go round the cycle to find any one unknown step.

2 What controls lattice energy



The lattice energy is more negative (stronger) for ions with a **smaller ionic radius** 离子半径 and a higher charge — they attract more strongly.

Watch out: you go round the Born–Haber cycle using Hess's law — the two routes from the elements to the ionic solid give the same total. Lattice energy is stronger (more negative) for *smaller* ions and *higher* charges.

Practice

Try these in order.

23.6 What does a *Born–Haber cycle* let you find? [1]

23.7 Name one step that goes *up* (costs energy). [1]

23.8 Which step is the big drop down? [1]

23.9 What law do you use to go round the cycle? [1]

23.10 Do *smaller* ions give a stronger or weaker lattice energy? [1]

23.11 Challenge. Lithium fluoride has a more negative lattice energy than potassium iodide, even though both are made of 1+ and 1− ions. Explain why. [2]