

Born-Haber Cycles

Chemistry

Calculating lattice enthalpy by an indirect route.

Building the cycle for a simple ionic compound.

1

Atomisation

Both elements to gaseous atoms. Endothermic.

2

Ionisation energy

Metal atom to cation. Endothermic.

3

Electron affinity

Non-metal atom to anion. First is exothermic; second is endothermic.

4

Lattice formation

Gaseous ions to solid lattice. Strongly exothermic.

5

Compare with ΔH_f

The direct route. Hess's law equates the two.

THEORETICAL VS EXPERIMENTAL

A large discrepancy indicates covalent character

Purely ionic model assumes point charges

Polarisation of the anion causes the difference

Lattice enthalpy magnitude increases with higher charges and smaller ionic radii — the two factors that matter.