

IB Chemistry Study Worksheet 15.2.1 and 15.2.2

1. Draw and label a Born-Haber cycle for the formation of calcium oxide.
2. Calculate the lattice enthalpy of calcium oxide from the following data.
 - enthalpy of atomisation of Ca(s): 178 kJmol⁻¹
 - first ionization energy of Ca(g): 590 kJmol⁻¹
 - second ionization energy of Ca(g): 1150 kJmol⁻¹
 - enthalpy of atomization of O₂(g): 249 kJmol⁻¹
 - first electron affinity of O(g): -141 kJmol⁻¹
 - second electron affinity of O(g): 844 kJmol⁻¹
 - enthalpy of formation of CaO(s): -635 kJmol⁻¹
3. The standard enthalpy of formation of KCl(s) is -437 kJmol⁻¹. In a Born-Haber cycle for the formation of KCl(s), which enthalpy change(s) are exothermic?
 - A) the lattice enthalpy and the electron affinity of chlorine
 - B) the electron affinity of chlorine
 - C) the formation of Cl(g) from Cl₂(g)
 - D) the enthalpy of atomization of K(s) and the first ionization energy of K(g)
 - E) lattice enthalpy
4. Calculate the lattice enthalpy of silver chloride from the following data.
 - enthalpy of atomisation of Ag(s): 284 kJmol⁻¹
 - first ionization energy of Ag(g): 731 kJmol⁻¹
 - enthalpy of atomisation of Cl₂(g): 122 kJmol⁻¹
 - first electron affinity of Cl(g): -349 kJmol⁻¹
 - enthalpy of formation of AgCl(s): -127 kJmol⁻¹
 - A) 1037 kJmol⁻¹
 - B) 661 kJmol⁻¹
 - C) 915 kJmol⁻¹
 - D) 1613 kJmol⁻¹
 - E) 1359 kJmol⁻¹