

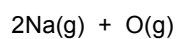


## THERMODYNAMICS (C)

- a** Complete the Born Haber cycle below for sodium oxide. Complete the lines, put arrows from one stage to another, and write on the values for the enthalpy change for each step on those arrows using the data below.

\_\_\_\_\_

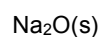
\_\_\_\_\_



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



\_\_\_\_\_

enthalpy of formation of sodium oxide =  $-416 \text{ kJ mol}^{-1}$

1<sup>st</sup> ionisation enthalpy of sodium =  $+494 \text{ kJ mol}^{-1}$

1<sup>st</sup> electron affinity of oxygen =  $-142 \text{ kJ mol}^{-1}$

2<sup>nd</sup> electron affinity of oxygen =  $+844 \text{ kJ mol}^{-1}$

atomisation enthalpy of oxygen =  $+248 \text{ kJ mol}^{-1}$

atomisation enthalpy of sodium =  $+109 \text{ kJ mol}^{-1}$

- b** Calculate the lattice enthalpy of formation for sodium oxide using the cycle.