

Answer:

To estimate the lattice enthalpy of sodium chloride, we use $z(\text{Na}^+) = +1$, $z(\text{Cl}^-) = -1$, $A = 1.748$ and $d = r_{\text{Na}^+} + r_{\text{Cl}^-} = 283 \text{ pm}$, hence (using fundamental constants from inside the back cover and ensuring that the units of d are appropriate to each part of the equation)

$$\Delta_{\text{L}}H^{\ominus} = \frac{(6.022 \times 10^{23} \text{ mol}^{-1}) \times (+1) \times (-1) \times (1.602 \times 10^{-19} \text{ C})^2}{4\pi \times (8.854 \times 10^{-12} \text{ J}^{-1} \text{ C}^2 \text{ m}^{-1}) \times (2.83 \times 10^{-10} \text{ m})} \times \left(1 - \frac{34.5 \text{ pm}}{283 \text{ pm}}\right) \times 1.748$$
$$= 7.56 \times 10^5 \text{ J mol}^{-1}$$

or 756 kJ mol^{-1} .

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