Q_1: Calculate the overall energy change for the formation of calcium bromide from calcium metal and liquid bromine. Given: Lattice energy of $CaBr_2$ is 2176 $kJmol^{-1}$; the bond energy of Br_2 is 224 $kJmol^{-1}$; bromine's energy of vaporization is 30.9 $kJmol^{-1}$; calcium's energy of vaporization is 178 $kJmol^{-1}$; IE_1 of Ca = 589.8 $kJmol^{-1}$; IE_2 of Ca = 1145 $kJmol^{-1}$; EA of Br = -324.6 $kJmol^{-1}$.

Q_2: Magnesium fluoride forms from the elements as follows:

$$Mg(s) + F_2(g) \longrightarrow MgF_2(s); \quad \Delta H^{\circ}_{reaction} = -1123\ kJmol^{-1}$$

The energy of vaporization of Mg is 148 $kJmol^{-1}$ and the bond energy of F_2 is 155 $kJmol^{-1}$. Use this information and data below to calculate the lattice energy of MgF_2.

IE_1 for Mg = 737.7 $kJmol^{-1}$; IE_2 for Mg = 1451 $kJmol^{-1}$;
EA for F = -328.0 $kJmol^{-1}$

Q_3: Solid silicon dioxide has one of the highest $\Delta H^{\circ}_{lattice}$ values due to its network structure. Silicon dioxide is found in pure crsytalline form as transparent rock quartz. Using the following data, calculate the $\Delta H^{\circ}_{lattice}$ of SiO_2.

$Si(s) \longrightarrow Si(g)$; ΔH° = 454 kJ
$Si(g) \longrightarrow Si^{4+}(g) + 4e^-$; ΔH° = 9949 kJ
$O_2(g) \longrightarrow 2O(g)$; ΔH° = 498 kJ
$O(g) + 2e \longrightarrow O^{2-}(g)$; ΔH° = 737 kJ
ΔH_f° of $SiO_2(s)$ = -910.9 kJ

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