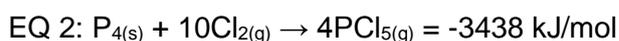
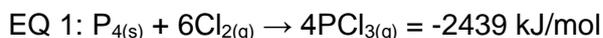


Answers on Question #55559 – Chemistry - Other

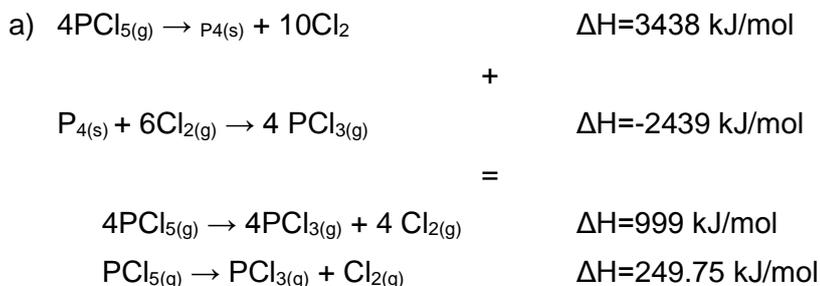
Question:

The reaction between phosphorous, $P_{4(s)}$, and chlorine, $Cl_{2(g)}$, is exothermic and leads to either $PCl_{3(g)}$ or $PCl_{5(g)}$ depending on the stoichiometric amount of $Cl_{2(g)}$ used. Given the following two chemical equations (EQ 1 and EQ 2) and their associated enthalpy changes for the formation of $PCl_{3(g)}$ and $PCl_{5(g)}$:



- Calculate the expected enthalpy change for the decomposition of one mole of $PCl_{5(g)}$ shown in equation 3 (EQ 3).
- Calculate the expected enthalpy change for the decomposition of 10.50 g of $PCl_{5(g)}$ shown in equation 3 (EQ 3).

Answer:



$$\text{b) } Q = -\Delta H \cdot v$$

$$M(PCl_5) = 208.24 \text{ g/mol}$$

$$v(PCl_5) = \frac{m}{M}$$

$$v(PCl_5) = \frac{10.50}{208.24} = 0.05 \text{ mol}$$

$$Q(PCl_{5(g)}) = -249.75 \cdot 0.05 = -12.59 \text{ kJ}$$