T5

Thermodynamic equations

1 mol $NH_4Cl \Rightarrow NH_4^+ + Cl^{-1}$ $\Delta H = +25KJ/rxn$

1. If 1 mole of ammonium chloride is dissolved, how much energy is absorbed?

$\Delta H = \rightarrow 25KJ$

2. If 2 moles ammonium chloride is dissolved, how much energy is absorbed?

$2 \times 25KJ = 50KJ$

3. If 53 grams of ammonium chloride is dissolved how much energy is absorbed?

$53g \cdot \frac{1\ mol}{53g} = 1mol \cdot \frac{25KJ}{1mol} = 25KJ$

4. If 5.3g of ammonium chloride is dissolved in how much energy is absorbed?

$5.3g \cdot \frac{1\ mol}{53g} = 0.1mol \cdot \frac{25KJ}{1mol} = 2.5KJ$

5. If 25g of ammonium chloride is dissolved, how much energy is absorbed?

$25g \cdot \frac{1\ mol}{53g} \cdot \frac{25}{1} = 11.7KJ$

6. If 90KJ of energy is absorbed, what is the mass of ammonium chloride dissolved?

$90KJ \cdot \frac{1\ mol}{25\ KJ} \cdot \frac{53g}{1mol} = 190g$

$2NH_4Cl \Rightarrow 2\ NH_4^+ + 2Cl^{-1}$ $\Delta H = ?$

7. What is the enthalpy for reaction above? $+50KJ$

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1 gram of glucose burns producing 15.5kJ of energy via the following reaction.

$C_6H_{12}O_6 + 6O_2 \Rightarrow 6CO_2 + 6H_2O$ $\Delta H = ?$

8. How much energy would be released if 2 grams of sugar were burned?

$2 \times 15.5 = 31KJ$

9. How much energy would be released if 180g were burned?

$\frac{2g}{31} = \frac{180g}{?}$ $? = 2790KJ$

10. How much energy would be released if 2 moles were burned?

$\frac{180}{1mol} = \frac{360}{2mol}$ $2(2790) = 5580KJ$

11. What is the enthalpy change for the reaction above?

$\Delta H = -2790$ ← Energy for 1 mol

12. What is the enthalpy change for the reaction below?

$2C_6H_{12}O_6 + 12O_2 \Rightarrow 12CO_2 + 12H_2O$ $\Delta H = ?$

2 moles ↑ excess ↑

-5580

"−" due to exothermic