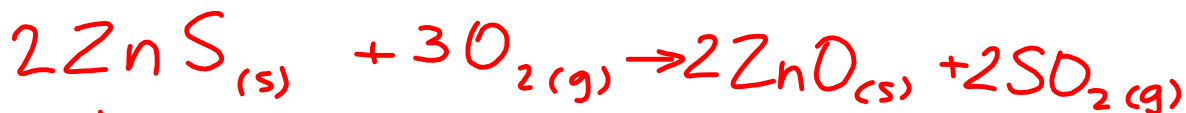**Multi step Hess's Law** $\Delta H = nH$

What is the quantity of energy that can be made from the roasting of 50. kg of zinc sulfide?

① Hess's Law short to get ΔH for reaction...

$$2ZnS_{(s)} + 3O_{2(g)} \rightarrow 2ZnO_{(s)} + 2SO_{2(g)}$$

$$\Delta H = \sum products - \sum reactants$$

$$\Delta H = \left(2\,mol \cdot \frac{-350.2\,KJ}{mol} + 2\,mol \cdot -296.8\,KJ/mol\right)$$

$$- \left(2\,mol \cdot -206.0\,KJ/mol + 0\right)$$

$$\Delta H = \left(-701.0\,KJ + -593.6\,KJ\right) + (+412.0\,KJ)$$

$$\Delta H = -882.6\,KJ$$

② Molar enthalpy for ZnS

$$\Delta H/n = H = -882.6\,KJ \Big/ 2\,mol \underset{reaction}{\overset{from}{\leftarrow}} = \frac{-441.3\,KJ}{mol}$$

③ moles of ZnS in 50. Kg $\Rightarrow$ 50000 g

$$n = \frac{m}{M} = \frac{50000\,g}{97.44\,g/mol} = 513\,moles$$

④ ΔH for 50. Kg of ZnS

$$\Delta H = nH = 513\,moles \cdot -441.3\,KJ/mol$$

$$\Delta H = -2.3 \times 10^5\,KJ$$