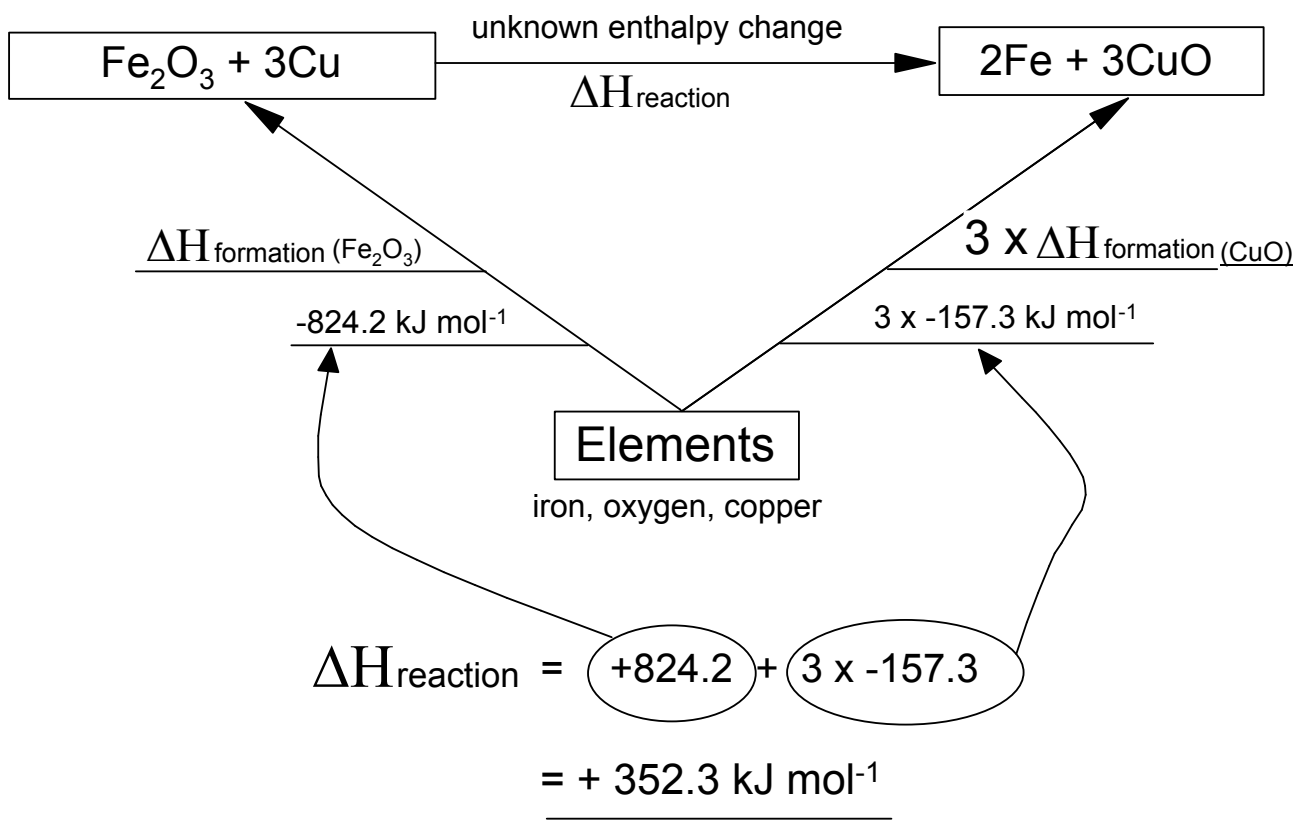


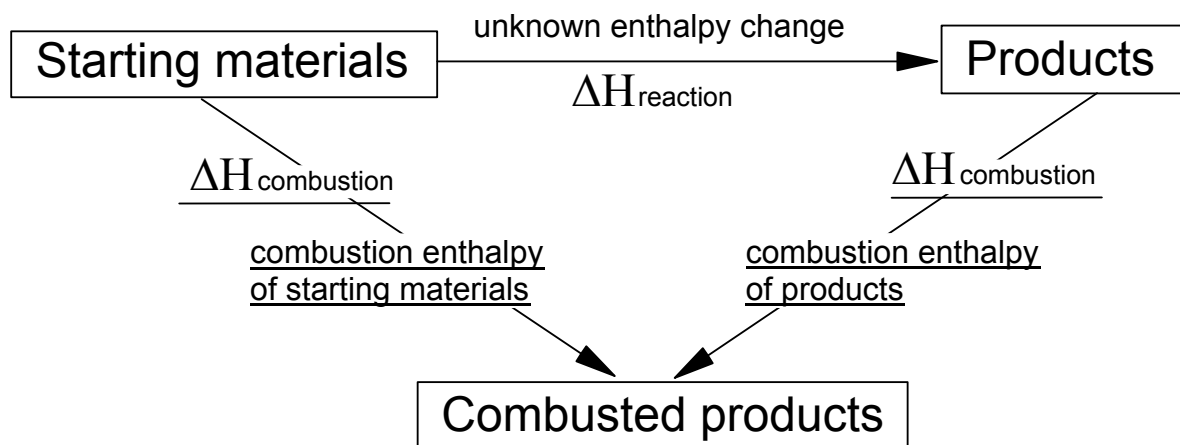
Example 1

Calculate the enthalpy change for the reduction of Fe_2O_3 by Cu to form Fe and CuO

$$\Delta H_{\text{formation}} (\text{Fe}_2\text{O}_3) = - 824.2 \text{ kJ mol}^{-1}$$

$$\Delta H_{\text{formation}} (\text{CuO}) = - 157.3 \text{ kJ mol}^{-1}$$





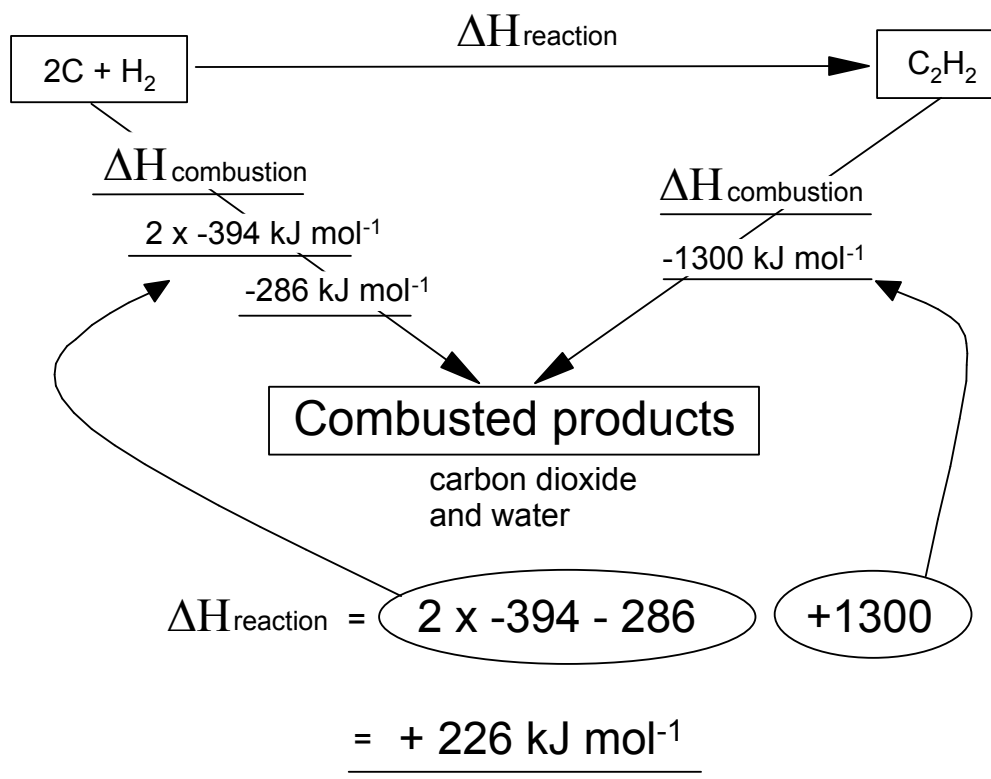
Example 2

Calculate the enthalpy change for the reaction of carbon with hydrogen to form C_2H_2 . What kind of enthalpy change is this?

$$\Delta H_{\text{combustion}} (\text{C}) = -394 \text{ kJ mol}^{-1}$$

$$\Delta H_{\text{combustion}} (\text{H}_2) = -286 \text{ kJ mol}^{-1}$$

$$\Delta H_{\text{combustion}} (\text{C}_2\text{H}_2) = -1300 \text{ kJ mol}^{-1}$$

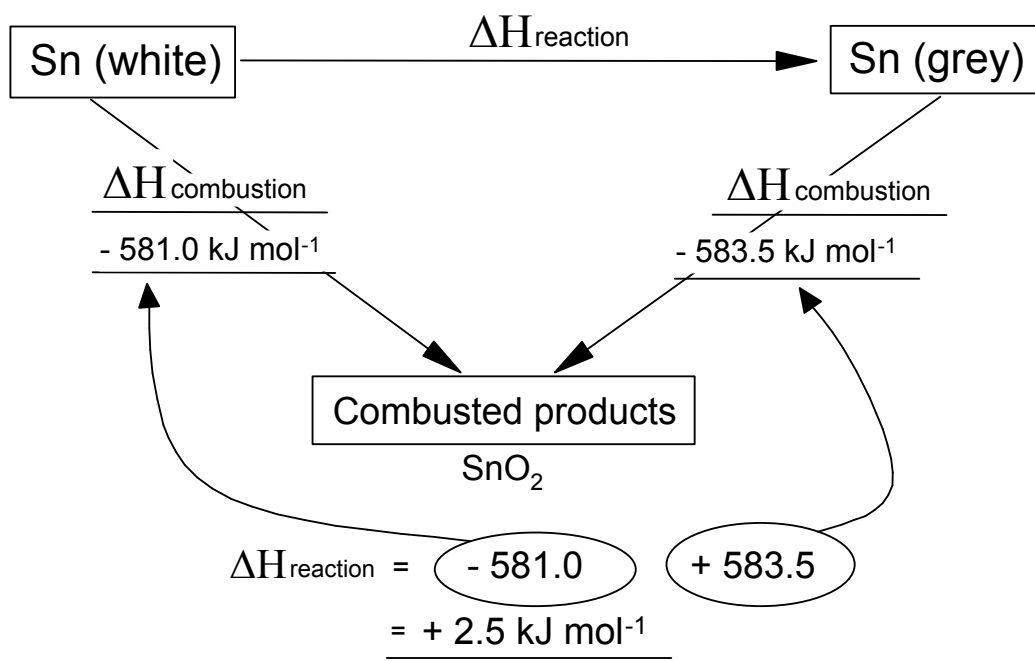


Example 3

Calculate the enthalpy change for the change from white tin to grey tin.

$$\Delta H_{\text{combustion}} \text{ Sn (white)} = -581.0 \text{ kJ mol}^{-1}$$

$$\Delta H_{\text{combustion}} \text{ Sn (grey)} = -583.5 \text{ kJ mol}^{-1}$$



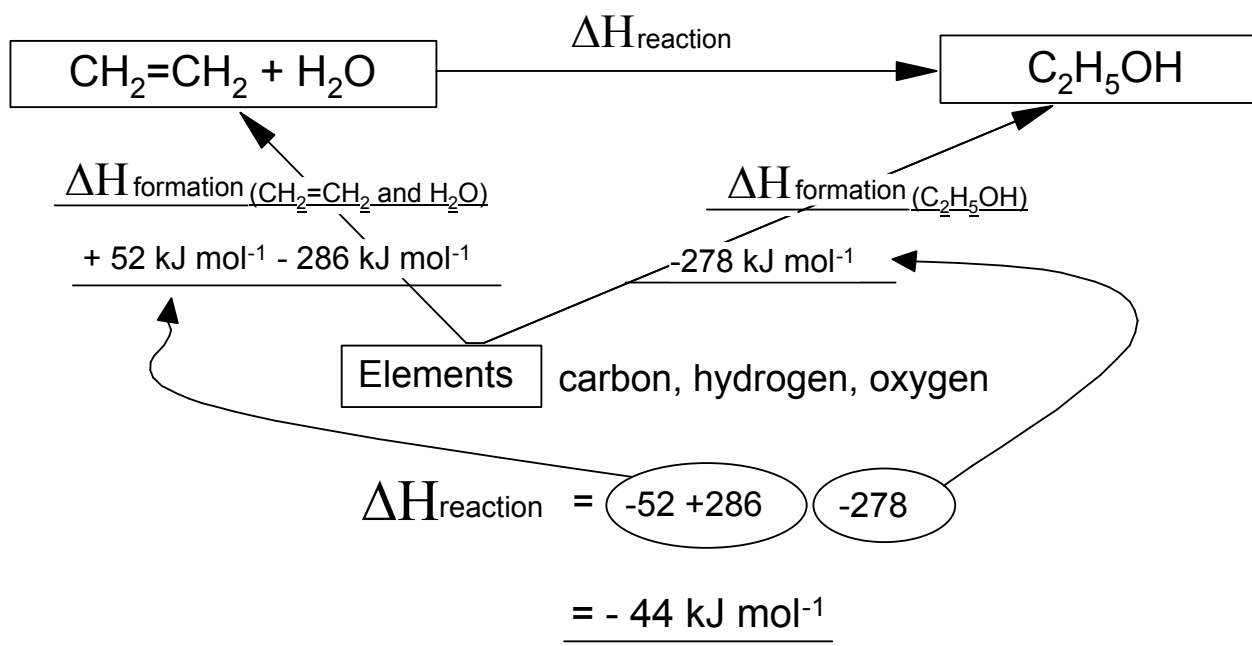
Example 4

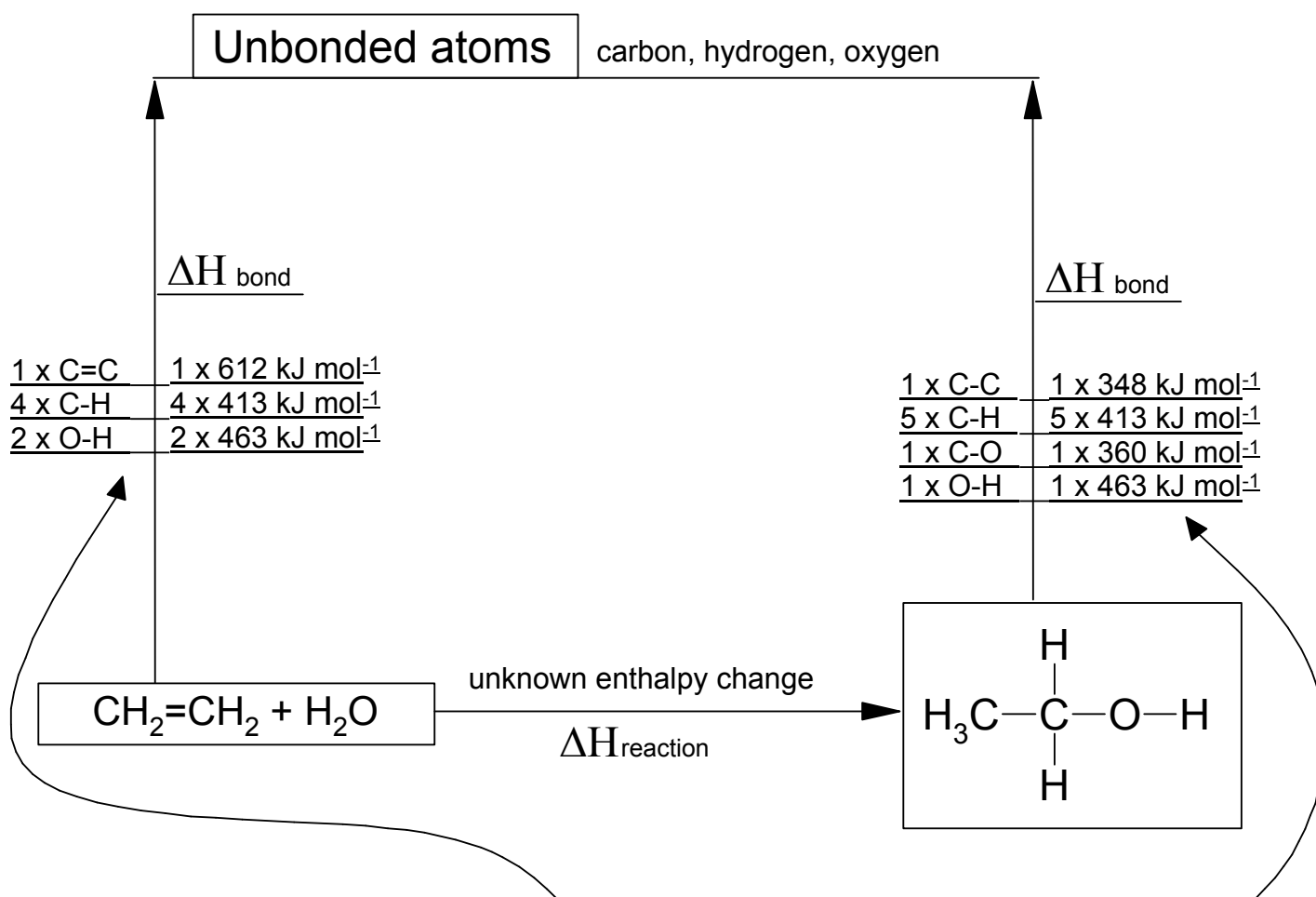
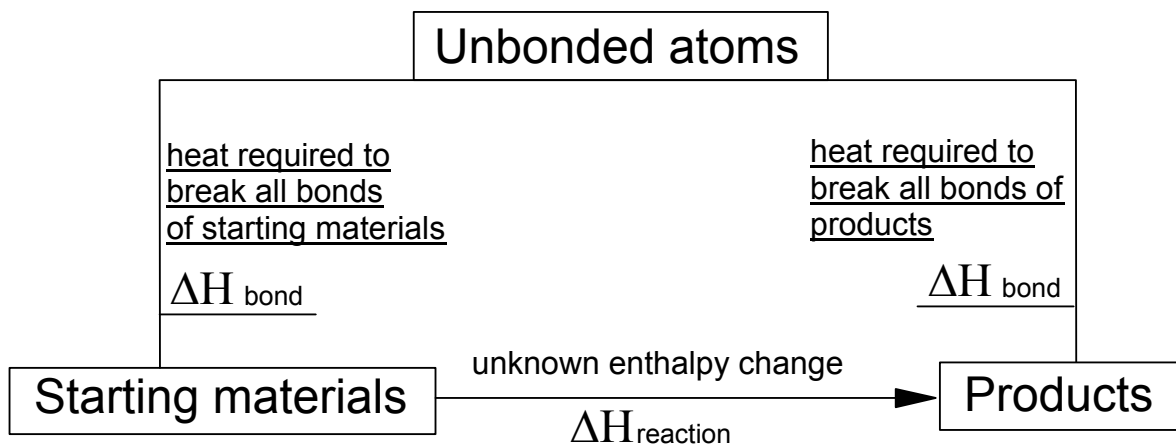
Calculate the enthalpy change for the reaction of ethene with water to form ethanol

$$\Delta H_{\text{formation}} \text{ (ethene)} = +52 \text{ kJ mol}^{-1}$$

$$\Delta H_{\text{formation}} \text{ (water)} = -286 \text{ kJ mol}^{-1}$$

$$\Delta H_{\text{formation}} \text{ (ethanol)} = -278 \text{ kJ mol}^{-1}$$





$$\begin{aligned}
 \Delta H_{\text{reaction}} &= 1 \times 612 + 4 \times 413 + 2 \times 463 \\
 &\quad - (1 \times 348 + 5 \times 413 + 1 \times 360 + 1 \times 463) \\
 &= 3190 - 3236 \\
 &= \underline{\underline{-46 \text{ kJ mol}^{-1}}}
 \end{aligned}$$