Write an equation including state symbols for the standard enthalpy of combustion of

$CH_{4(g)}$ and $CH_3COOH_{(l)}$

Write an equation including state symbols, for the standard enthalpy of formation of

$CH_3OH_{(l)}$, $AlCl_{3(s)}$ and $CuSO_4 \cdot 5H_2O_{(s)}$

How will you differentiate between both enthalpies of reaction?

Answer:

$CH_{4(g)} + 2O_{2(g)} = CO_{2(g)} + 2H_2O_{(g)}$ ΔH= -802.4 kJ/mol
$CH_3COOH_{(l)} + O_2 = CO_{2(g)} + 2H_2O_{(g)}$ ΔH= -871.5 kJ/mol

$CO_{2(g)} + 2H_2O_{(l)} \rightarrow CH_3OH_{(l)} + (3/2)O_{2(g)}$; ΔH = +726.4 kJ/mol

$2\ Al_{(s)} + 3\ Cl_{2(g)} - \rightarrow 2\ AlCl_{3(s)}$; ΔH = −705.63 kJ/mol

$Cu_{(s)} + S_{(s)} + 5H_2O_{(g)} + 2O_{2(g)} \rightarrow CuSO_4 \cdot 5H_2O_{(s)};$ ΔH = -11.7 kJ/mol