5/52 | 2.42 J / g·K | 62 g EG | 13.1 → 40.5 | ΔT = 27.4 K

2.42 J / g·K	62 g EG	27.4 K

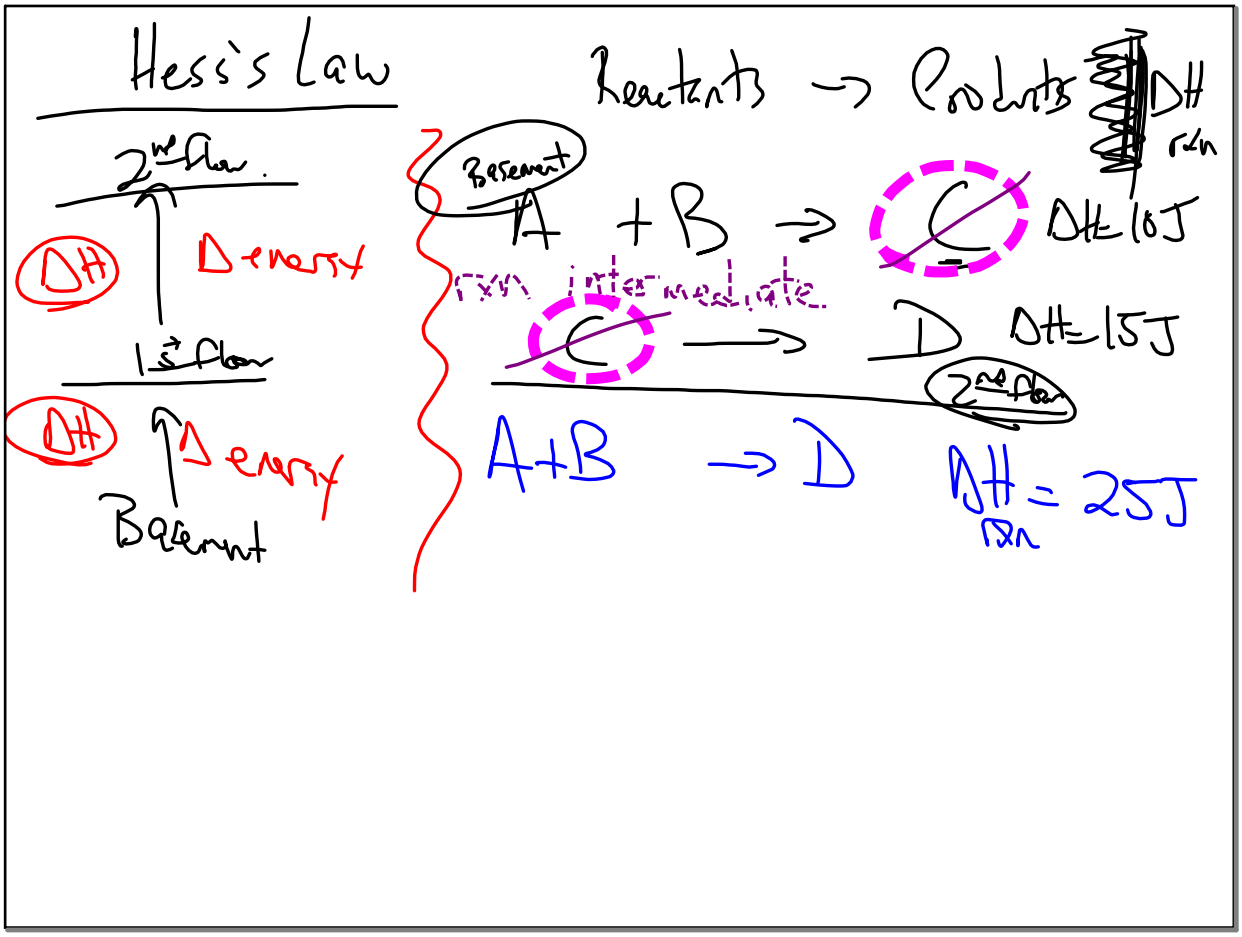
5/59 38.8 g NH_4NO_3 / 60 g H_2O → 63.88 g soln

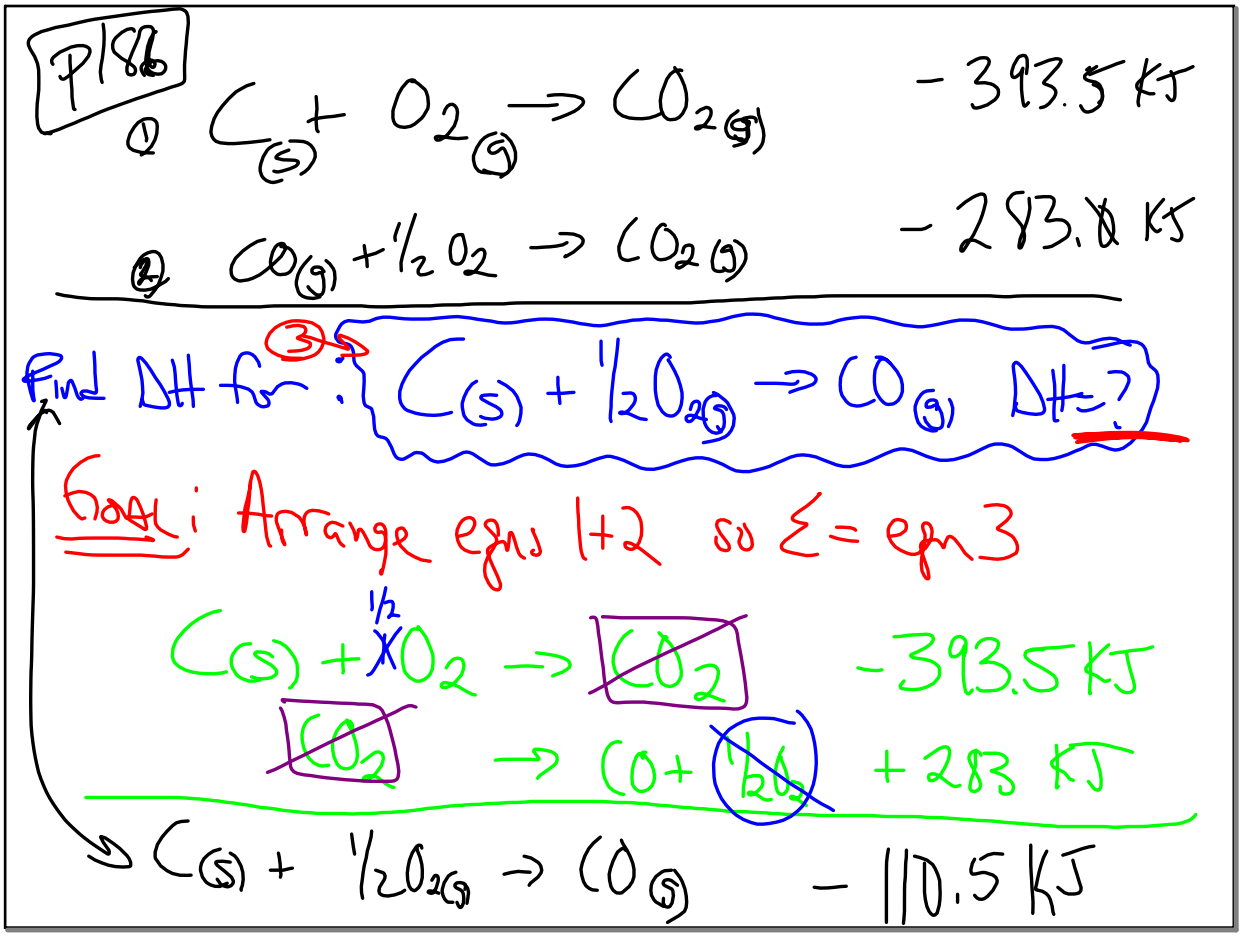
ΔT = 23 − 18.4 = 4.6 K = 4.6 °C

Find ΔH (kJ / mole NH_4NO_3) for the solution.

C = 4.18 J / g·K

4.18 J / g·K	63.88 g soln	4.6 K	3.84 g NH_4NO_3	80 g NH_4NO_3 / 1 mole NH_4NO_3 =


Hess's Law
Reactants → Products
ΔH rxn
2nd flow
ΔH
Δ energy
1st flow
ΔH
Δ energy
Basement
Basement
A + B → C
ΔH = 10J
rxn intermediate
C → D
ΔH = 15J
2nd flow
A + B → D
ΔH rxn = 25J


P186
① C(s) + O2(g) → CO2(g) -393.5 KJ
② CO(g) + ½ O2 → CO2(g) -283.0 KJ
Find ΔH for: ③ C(s) + ½O2(g) → CO(g) ΔH = ?
Goal: Arrange eqns 1+2 so Σ = eqn 3
C(s) + ½O2 → CO2 -393.5 KJ
CO2 → CO + ½O2 +283 KJ
C(s) + ½O2(g) → CO(g) -110.5 KJ

$1 = \frac{2}{2} \cdot \frac{1}{2}$

$\frac{1}{2} \cdot \frac{1}{2}$

$\frac{1}{2}$

0

5.9

① $C_2H_2 + \frac{5}{2}O_2 \Rightarrow 2CO_2 + H_2O_{(l)}$ $-1299.6\ kJ$

② $C_{(s)} + O_2 \Rightarrow CO_2$ $-393.5\ kJ$

③ $H_2 + \frac{1}{2}O_2 \Rightarrow H_2O_{(l)}$ $-285.8\ kJ$

Want $2C_{(s)} + H_2 \Rightarrow C_2H_2$

Double the whole reaction eqn 2

② $2C_{(s)} + 2O_2 \Rightarrow 2CO_2$ $2(-393.5)$

③ $H_2 + \frac{1}{2}O_2 \Rightarrow H_2O_{(l)}$ $-285.8\ kJ$

① $2CO_2 + H_2O_{(l)} \Rightarrow C_2H_2 + \frac{5}{2}O_2$ $+1299.6\ kJ$

$2C_{(s)} + H_{2(g)} \Rightarrow C_2H_{2(g)}$

Enthalpy (ΔH) of formation

Std conditions

ΔH_f°

$$\Delta H_{formation} = n\sum \Delta H_{prod} - n\sum \Delta H_{react}$$

Coefficient Balanced eqn #moles

Sum Capital Greek Sigma

Find ΔH_r

p189 + Appendix C p 1112-1114 ΔH_f

$$C_3H_{8(g)} + 5O_{2(g)} \rightarrow 3CO_{2(g)} + 4H_2O_{(g)}$$

$$\Delta H_r = n\Sigma_{prod} - n\Sigma_{react}$$

$$\Delta H_r = [3(\Delta H\, CO_{2(g)}) + 4(\Delta H H_2O_{(g)})] - [\Delta H\, C_3H_8 + 5(\Delta H\, O_{2(g)})]$$

$$[3(-393.5) + 4(-285.8)] - [-103.85 + 5(0)]$$

$$-2219.9\ kJ$$