Today: Lattice Energy & Hess's Law — November 8th
Sunday: Problem club w/ Kendall
→ Study Pre-Lab Expt 11
Monday: CK4
Tuesday: Expt 11

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*Fire Friday experiment:

$r = 12\,cm \rightarrow 7.2\,L$

$V = 4/3\,\pi r^3$

$0.32\,mol\,CH_4$

$\Delta H = -803\,kJ/mol\,CH_4$
$\Delta H = -803\,kJ / 2\,mol\,O_2$
$\Delta H = -803\,kJ / mol\,CO_2$
exothermic

$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g) \quad \Delta H^\circ = -803\,kJ$

ΔH_f°: $-75\,kJ/mol$ | $0\,kJ/mol$ | $-394\,kJ/mol$ | $-242\,kJ/mol$

$*-1\,mol$ | $*-2\,mol$ | $*1\,mol$ | $*2\,mol$

$\Delta H^\circ_{rxn} = +75\,kJ + 0\,kJ - 394\,kJ - 484\,kJ = -803\,kJ$

$$q = \frac{0.32\,mol\,CH_4}{} \left| \frac{-803\,kJ}{mol\,CH_4} \right. = \boxed{-260\,kJ}$$

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* Hess's law

Lattice Energy | $Mg^{2+}(g) + 2Cl^-(g) \rightarrow MgCl_2(s)$

ionization energies

$Mg(s) \rightarrow Mg(g) \quad \Delta H = +148\,kJ/mol$ → $+148$
$Mg(g) \rightarrow Mg^+(g) + e^- \quad \Delta H_{i1} = +738\,kJ/mol$ → $+738$
$Mg^+(g) \rightarrow Mg^{2+}(g) + e^- \quad \Delta H_{i2} = +1451\,kJ/mol$ → $+1451$
$Cl_2(g) \rightarrow 2Cl(g) \quad \Delta H = +243\,kJ/mol$ → $+243$
electron affinity: $2 \times (Cl(g) + e^- \rightarrow Cl^-(g)) \quad \Delta H = -349\,kJ/mol \times 2$ → -698
$Mg^{2+}(g) + 2Cl^-(g) \rightarrow MgCl_2(s) \quad \Delta H =$ → $+X$
→ -642

heat of formation

$Mg(s) + Cl_2(g) \rightarrow MgCl_2(s) \quad \Delta H_f^\circ = -642\,kJ/mol\,MgCl_2$

$X = -2524\,kJ$

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#4 chap 9 day 2

$4NH_3 + 7O_2 \rightarrow 4NO_2 + 6H_2O(\ell)$

	$4NH_3$	$7O_2$	$4NO_2$	$6H_2O(\ell)$
ΔH_f°	−46	0	+33	−286
	*−4	*−7	*4	*6
	+184	+0	+132	−1716

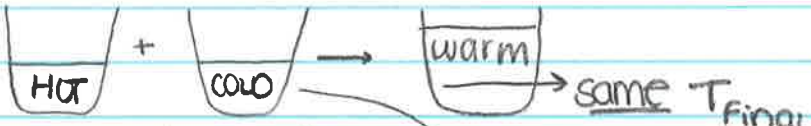
$\Delta H^\circ_{rxn} = +184 + 0 + 132 - 1716 = -1400\ KJ$

$$\Delta H = \frac{-1400\ KJ}{4\ mol\ NH_3} = -350\ KJ/mol\ NH_3$$

$Cl_2(g)$
$Br_2(\ell)$ LDF ∝ MM
$I_2(s)$

	Lewis →	ABE →	Answer
②	SH_2	AB_2E_2	polar
③	BH_3	AB_3	non-polar
①	NH_3	AB_3E	polar → H-bonding

#5 chap 9 Day 1



$q_{hot} = C * m * (T_{final} - 85°C)$

$q_{cold} = C * m * (T_{final} - 15°C)$

$q_{hot} = -q_{cold}$

$C * 125g * (T_{final} - 85°C) = -C * 200g * (T_{final} - 15°C)$

$T_{final} = 57.5°C$ ✓

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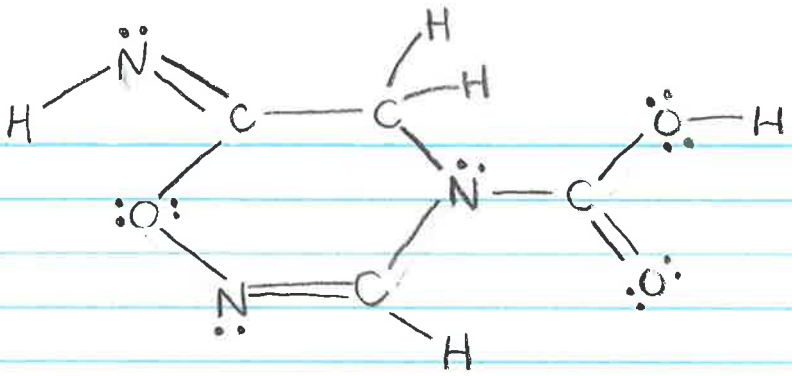

↑ Exam 4 → 2017 #6