Outline

	Date	Class #		Comb. Lecture	Problem Due
Nov	11	19 √	Concepts, Candle, Fireplace, Premixed, Diffusion	1	
			Heats of Formation, Heats of Reaction, Heat Capacities,		
	13	20 √	Enthalpies	2	#1
	18		Stoichiometry, Equilibrium Constants	3	#2,#3
			Adiabatic Flame Temperature, Multi-Component		
	20	22	Equilibrium, NASA-Lewis Code	4	#4
	27		BYU Friday, **NO Class**		
	29		**Thanksgiving**		
Dec	2	25	Heterogeneous Combustion	5	#5
	4	26	NO_x Mechanisms, Soot	6	#6
	9	27	Flame Speeds, Turbulence, Explosions	7	#7
	11	28	Review	8	#8

Progress

- ✓ Diffusion Flames
- ✓ Premixed Flames
- • Homogeneous Combustion
- • Heterogeneous Combustion
- • Deflagration
- • Detonation
- • Stoichiometric
- • Equivalence Ratio
- • Extinction
- • Flammability Limits
- ✓ Heat of Vaporization
- ✓ Heat of Combustion
- ✓ High Heating Value
- • Chemical Equilibrium
- • Dissociation
- ✓ Heats of formation & reaction
- ✓ Underventilated flames
- ✓ Overventilated flames
- • Adiabatic Flame Temperature
- ✓ Soot
- ✓ Blackbody Radiation
- • Thermal NOx
- • Turbulence
- • Ignition
- • Flame Speed
- • Flashback

Progress (cont.)

- ✓ How does a candle work?
- ✓ How does a fireplace work?
- • Regimes of heterogeneous combustion
- • Sources of NOx
- • Single particle vs. cloud combustion
- ✓ As rec'd, dry, and daf bases for coal
- • Turbulence effects
- • Swirl
- • Use of NASA-Lewis code
- • Elementary step reaction sequences vs. global mechanisms

Equilibrium Constants

- Find values of K_{eq}
  - Find ΔG_f^0 for each species at each T
  - Compute ΔG_{rxn} at each T
  - Find K_{eq} at each T ($\Delta G_{rxn} = -RT \ln K_{eq}$)
- Find values of K_y
  - $K_{eq} = K_y K_{Ptot}$
- Find expression for K_y in terms of y_i
  - Use extent of reaction ($n_{i,0} - x$)
  - Get expressions for y_i in terms of x
  - $K_y = \Pi y_i^{\nu_l}$
- Solve for x and then calculate y_i's