

## Memo 1 General Feedback (2006 Class)

1. **SHOW ALL WORK AND CITE REFERENCES FOR ALL ASSUMPTIONS.**
2. Mass balances must close exactly. If they don't, your stoichiometry is off in one or more of your reactions.
  - a. Your mass balances should be done in SI units [kg/sec] and [kmol/sec].
  - b. In figuring your rates, assume a reasonable uptime rate -- for instance, you might figure on at least 2 weeks downtime for scheduled maintenance. State your uptime assumptions.
3. Write balanced equations for all reactions considered so that I can follow what you are doing.
4. A general stoichiometric table should be included in your hand calculations. (Refer to Table 3-4 in Fogler).
5. Selectivity
  - a. Fogler defines a rate-based instantaneous selectivity and a molar product-based total selectivity, the latter being defined as the moles of desired products over the moles of undesired products ( $S_{D/U}=F_D/F_U$ ).
  - b. Fogler defines total yield as the moles of product over the moles of reactant consumed ( $Y_D=F_D/(F_{A0}-F_A)$ ). In many cases in the literature, the selectivity cited is equivalent to the yield as defined by Fogler.

### **YOU MUST CHECK THE DEFINITIONS IN THE ORIGINAL SOURCES TO BE SURE OF YOUR ASSUMPTIONS.**

6. Include hand calculations for all energy balances. Stating that you did the work in an Excel worksheet does not allow me to follow and check your work.
7. An isothermal energy balance at 25°C is equivalent to the heat of reaction at 25°C.
  - a. This is a fine calculation to perform, but to assess the reactor heat duty under isothermal reaction conditions, this requires doing the enthalpy balance at your assumed reaction temperature.
  - b. An isothermal energy balance at reaction temperature requires that you integrate your heat capacity expressions for reactants and products. (See Felder and Rousseau example 9.5-1). **SHOW YOUR WORK.**
8. The adiabatic balance also requires  $C_p$  vs.  $T$  integration as well as a search for the adiabatic temperature. If you use a computational tool to find the adiabatic temperature, you need to outline your method so I can evaluate your procedure. (See Felder and Rousseau example 9.5-3).
9. In the write-up of about your kinetics from the literature, please include the expressions in the text and an exact citation for your references.
  - a. All ACS and Science-Direct references should be readily available and not require Inter-Library Loan, so obtain them directly.
  - b. If you need assistance in locating a reference, please contact Dr. LaMarca.