

CBE 60546

Adv Rxn Engineering

my name & background

What is rxn engineering?

Understanding, modeling, designing,
using, controlling, analyzing anything
in which chemical reactions happen

Industrial

petro refining - cracking
hydroprocessing
reforming
HDX, $x = O, S, N, \dots$

biofuels -

commodity chemicals ($NH_3, H_2SO_4,$
fine chemicals ethylene)
pharmaceuticals

Energy storage

Batteries, fuel cells

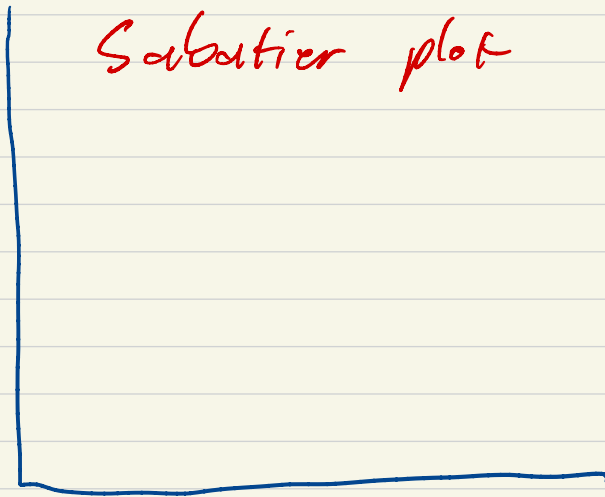
Environmental systems

lake, atmosphere, ..., env. protection
(bioreactors)

biological systems - cell, organ, body

Laboratory reactors - interrogate & quantify

Research - describe
understand
guide
research to develop improved
processes & materials



Our domain

chemical reactions

chemistry
stoichiometry
thermo
- equil.
- heat

kinetics
- rates
- mechanisms



physical/
chemical
interactions

transport
mixing
diffusion

heat & mass



chemical
reactors

ideal: batch, CSTR, PFR
non-ideal
isothermal / adiabatic
steady / non-steady
single / multiphase



chemical processes



markets / economics / ...

CRIE is beautiful because it ties so much of chem e together, is so widely important, and is where we have leverage to make the world better.

Roster

Syllabus

Website

- 1) chemical rxns, stoichiometry, progress
- 2) chemical thermo
- 3) basic theory of chemical kinetics