

# Chemistry 470 - "Industrial Chemistry"

## Mid-Term Examination Study Guide

Spring, 2010

### Catalytic Kinetics

- Catalytic vs. Non-Catalytic Kinetics
- Reaction Order
  - Effect of T
  - Effect of P
- Steps in Catalytic Reaction
  - Adsorption (Heat of Adsorption)
  - Surface Reaction
  - Desorption
- Activation Energy
  - True
  - Apparent
  - Effect of T
- Uni-molecular Reactions
  - Langmuir Model
  - Inhibition
- Bi-molecular Reactions
  - Langmuir-Hinshelwood Model
  - Rideal-Eley Model

### Industrial Metallurgy

- Iron and Steel
  - Blast Furnace
  - Basic Oxygen Converter
  - Iron-Carbon Phase Diagram
- Copper
  - Froth Flotation
  - Ore Smelting
- Aluminum
  - Hall-Héroult Process

### Inorganic Commodity Chemicals

- Sulfuric Acid
  - Sulfur Oxidation
  - SO<sub>2</sub> Oxidation
    - Thermodynamics
    - Reactor Design
  - SO<sub>3</sub> Absorption
- Phosphoric Acid
  - Manufacture
  - Uses

Chlorine

Chlor-Alkali Process

Mercury Cell

Diaphragm Cell

Membrane Cell

Solvay Process

### Synthesis Gas Processes

H<sub>2</sub>/N<sub>2</sub> and H<sub>2</sub>/CO Production

Desulfurization

Steam Reforming

Primary, Secondary

Catalyst(s)

Thermodynamics

Reaction Conditions

Water-Gas Shift

HT, LT

Catalysts

Thermodynamics

Reaction Conditions

Methanation

Catalyst

Reaction Conditions

Ammonia

Synthesis

Catalyst

Thermodynamics

Reaction Conditions

Oxidation

Catalyst

Reaction Conditions

Nitric Acid

Methanol

Catalyst

Thermodynamics

Reaction Conditions

Formaldehyde

Acetic Acid

Acetic Anhydride