MATERIALS AND REACTIONS LABORATORY

LAB CONCEPTS

Ch En 345

	Lab	Key Concept
1	CRE Calculations Preview	CRE design equations (batch, CSTR, PFR) come from material balances and rate laws
2	Batch: Reaction Order Determination	To determine reaction orders in a rate law, you must change initial concentration of reactants, measure changes produced by a reactor, and apply design equations; concentration can be measured by light absorption
3	Batch: Arrhenius Constants	To determine Arrhenius constants in a rate law, you must change temperature, measure changes produced by a reactor, and apply design equations
4	CSTR Design	Conversion of reactant increases with mean residence time in a CSTR
5	PFR Design	Conversion as a function of position in a PFR is analogous to conversion as a function of time in a batch reactor
6	Statistics: 2-Sample T-Test	Consistency between two sets of measurements, nominally for the same property, can be determined statistically
7	Tensile Stress-Strain	Polymers and metals have distinct tensile stress-strain behaviors and failure modes
8	Creep	Stress-strain behavior, especially for polymers, has a relaxation time component
9	Pressure Relief Valve	PRVs must be properly set according to Maximum Allowable Working Pressure and sized according to needed relieving capacity
10	Salt Corrosion	Unprotected plain steel corrodes faster in saltwater than other common structural metals
11	Corrosion Protection	Steel can be protected from corrosion by the proper application of an anode and power supply
12	Polymer Degradation	Polymers can be degraded by solvents and oxidizers, especially when under tension; laboratory gloves must be matched to the chemicals being used
13	Surface Tension	Capillary rise depends on surface tension and tube diameter