

CHEM 341L Lab Final Review Sheet Spring 2009:

Diels-Alder

- ☛ Mechanism: concerted, [4+2] cycloaddition, 4π diene + 2π alkene, cyclohexene adduct
- ☛ Endo and exo diastereomers possible
- ☛ Our product crystallized from solution

Nucleophilic Substitution S_N1

- ☛ rate \propto [substrate] only
- ☛ favored by polar protic solvents
- ☛ mechanism, stepwise *via* carbocation
- ☛ reaction was studied after 10% reaction by addition of OH^- and bromophenol blue indicator, as reaction proceeds acid produced, hydroxide consumed

Competitive Nitration

- ☛ Toluene more reactive than benzene
- ☛ $\text{HNO}_3/\text{H}_2\text{SO}_4$ nitration conditions
- ☛ nitro group is NO_2
- ☛ ortho and para favored in nitration of toluene
- ☛ isomeric percentages obtained from % peak areas from GC chromatogram
- ☛ review background on GC: retention times, resolution, how compounds separate on GC column

Spectroscopy/Unknowns

- ☛ Using MS, ^1H NMR and ^{13}C NMR spectra to determine structures of unknown organic compounds
- ☛ MS: isotopic M, M+2 peaks from chlorides and bromides. M-18 for alcohols, determine M^+ for molecular formula, base peak
- ☛ ^{13}C NMR: Know chemical shifts of common carbons, determine attached hydrogens, structure elucidation.
- ☛ ^1H NMR: Know chemical shifts of common hydrogens, splitting patterns to determine adjacent H's, no splitting through heteroatoms (O, N), broad exchangeable OH's (*e.g.* ROH, RCO_2H), structure elucidation.