

## Study Guide for Exam 2

### Chapters 19, 20, 21 and 25

#### Carboxylic Acids

Nomenclature

Synthesis

Oxidation of Primary Alcohols

Oxidation of Arenes

Carbonation (addition of CO<sub>2</sub>) to Grignard Reagents

Hydrolysis of Nitriles

Reactions

Reduction to Alcohols

Alpha-halogenation (X<sub>2</sub>, P)

#### Functional Derivatives of Carboxylic Acids (Acid Chlorides, Anhydrides, Amides, Esters)

Nomenclature

Synthesis

Acid Chlorides (SOCl<sub>2</sub>, PCl<sub>3</sub>, PCl<sub>5</sub>)

Esters (from: Carboxylic acids, Acid chlorides, Anhydrides)

Amides (from: Acid Chlorides)

Esters (from: Carboxylic acids, Acid chlorides, Anhydrides)

Transesterification

Reactions

Acid Chlorides

Hydrolysis

Ammonolysis

Alcoholysis

Friedel-Craft Acylation

Coupling with Lithium Dialkylcuprates

Reduction

Anhydrides

Hydrolysis

Ammonolysis

Alcoholysis

Friedel-Craft Acylation

Amides

Hydrolysis

Esters

Hydrolysis

Ammonolysis

Alcoholysis

Grignard Reagents

Reduction

Claisen Condensation

#### Carbanions I (great Nucleophiles!)

Understand Nucleophilic Acyl Substitution vs. Nucleophilic Addition

## Reactions

Alpha-halogenation of Ketones

Aldol Condensation

Related Reactions (KOH, NaOCH<sub>2</sub>CH<sub>3</sub>, NH<sub>3</sub>(l), Perkin condensation)

Crossed Aldol Condensation

Claisen Condensation

Crossed Claisen Condensation

Coupling of Lithium Dialkyl Cuprates with Acid Chlorides

Addition of Grignard Reagents

Wittig reaction