



## REACTIONS



### Palladium and Nickel Catalyzed

- Heck
- Sonogashira
- Suzuki and Related

### Organometallic Chemistry

- Grignard
- Alkylolithiums

### Chiral Chemistry

- Chiral Catalysis
- Asymmetric Synthesis
- Diastereomer Salt Crystallization
- Enzymatic Resolutions

### Heterocycles

- Pyridines
- Quinolones
- Thiophenes
- Oxazoles
- Piperazines
- Phenazines
- Imidazoles

### Heterocycles

- Indoles and Tryptophanes
  - Ring Synthesis: Fischer, Batcho-Leimgruber, Muchowski, Reissert, Japp-Klingemann, Moody, Madelung
  - Ring Modification and Substitution
- Furanes
  - Cu-Catalyzed Arylation
  - Side-Chain Modification
  - Aminoalkylation

**REACTIONS****Biphenyls and Fluorenes**

- Synthesis: DMG-Snieckus and Suzuki
- Cyclizations: PPA, Friedel-Crafts and Eaton's
- Side-Chain Modification and Substitution

**Amino Acids and Small Peptides**

- Protection of Amino and Carboxylic Group
- Functional Modifications: Formation of Alcohols, Aldehydes, Aminoketones, Carbonylimidazolides, Mixed Anhydrides, etc.
- Direct and Assisted by Auxiliary Reagents Peptide Bond Formation

**Nucleosides and Sugars**

- Synthesis and Modification of Nucleobase
- Modification and Deoxygenation of Ribose Ring
- Activation, Protection, Coupling and Deprotection

**Reagents for Nucleotide Synthesis**

- Phos Reagent
- Menpoc Chloride



## REACTIONS



### Classical Organic Synthesis

- Acetoacylation, Acylation, Aldol Condensation, Alkoxylation, Alkylation, Allylic Bromination, Amidation, Amination
- Benzoylation, Bromination
- Carbamoylation, Carboxylation, Chlorination, Chloromethylation, Chlorosulfonation, Claisen Condensation, Cyclopropanations, Cyanation, Cyclization
- Dealkylation, Decarboxylation, Dehalogenation, Dehydrogenation, Deoxygenation, Diazotization, Dieckmann Cyclization, Diels-Alder, Doebner-Knoevenagel Condensation, Diazomethane (small scale)
- Esterification, Etherification
- Formylation, Friedel-Crafts, Fries Rearrangement
- Gomberg-Bachmann, Grignard
- Halide Exchange, Halogenation, Hofmann Degradation, Indole Cyclizations, Hydroformylation, Hydroxylation, Hydrogenation (up to 300psi), Hydrolysis
- Kolbe-Schmitt, Ketalization
- Mannich, Micheal, Mitsunobu
- Nitration, Nitrosation
- Oxidation (Classical, TEMPO/NaOCl, Pyr-SO<sub>3</sub>)
- Phosgenation
- Reduction, Reformatsky
- Sandmeyer, Saponification, Silylation, Sulfonation
- Thiophosgenation, Transesterification
- Ullmann
- Vilsmeier-Haack
- Williamson, Wittig