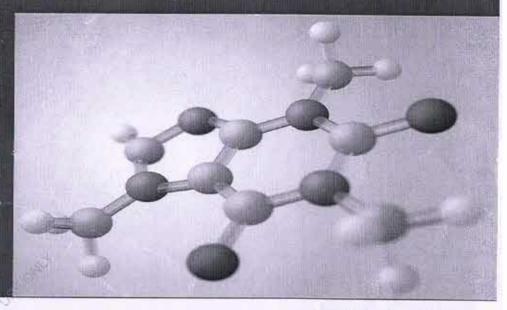
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Organic Chemistry For Degree Students

delighted the The authors are to present CHEMISTRY FOR DEGREE STUDENTS" in the hands of students. This book aims to help students not only to acquire a sound knowledge and understanding of organic chemistry, but also to make their study interesting and stimulating. We conceived the idea of writing this book with the objective to provide clarity on the concepts that will help students in their studies. The book is expected to make it easier for students to



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Organic Chemistry

For Degree Students



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CONTENTS

Nomenclature of Organic Compounds

Functional groups and types of organic compounds, Basic rules of IUPAC Nomenclature, Nomenclature of mono and bi- functional compounds on the basis of priority order of following classes of organic compounds: alkanes, alkenes, alkynes, alcohols, ethers, aldehydes, ketones, carboxylic acid, carboxylic acid derivatives (acid halides, esters, anhydrides, amides), amines; Nomenclature of aromatic compounds: Mono, di and polysubstituted benzene (with not more than two functional groups)

Basic Concepts in Organic Chemistry

Basic terms: Substrate and Reagents, types of reagents (Electrophilic and Nucleophilic). Notation of arrows: curved arrow, half headed arrow, double headed arrow, straight arrow. Bond fission: Homolytic and heterolytic fission. Reaction intermediates: Carbocation, Carbanion, Free radical, (Introduction, structure & Stability), carbene, nitrene & benzyne (only introduction). Electron mobility: Inductive effect (effect on acidic strength of alpha substituted acetic acid and α-chloroacetic acid), Mesomeric effect (Aniline and Nitrobenzene), Hyperconjugation (toluene).

Alkanes Alkenes and alkynes

- 3.1 Alkanes: Introduction, Preparation of alkanes from a) Hydrolysis of Grignard reagent b) Kolbe's synthesis. Chemical reaction: a) Pyrolysis (mechanism), b) aromatization.
- 3.2 Alkenes: Introduction, Preparation methods a) But-1-ene from but-1-yne b) But-2-ene from butan-2-ol. Chemical reactions with mechanism: a) Electrophilic addition of Br₂ to ethene b) Electrophilic addition of HBr to propene (Peroxide effect).
- 3.3 Alkynes: Introduction, Preparation of ethyne from a) Iodoform, b) Hydrolysis of calcium carbide. Chemical reactions: Electrophilic addition of HBr and Br₂ to ethyne (with mechanism)

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4.1 Cycloalkanes: Introduction, Preparation of cycloalkanes from a) Adipic acid b)

Aromatic hydrocarbon. Baeyer strain theory and Saches Mohr theory. Ring opening reaction with H₂ and HI.

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- 4.2 Cycloalkenes: Introduction, preparation methods, a) Dehydration of cyclobera, b) Dehydrohalogenation of halocyclohexane. Chemical reactions, a) Epology of cyclobexene, b) Allylic balogenations.
- 4.3 Dienes: Introduction, classification & Resonance structures. Preparation triefly of 1,3-butadiene from: a) 1,4-dibromobutane, b)1.4-butanediot Gliego of 1,3-butadiene (a) addition of 8r₂ and HBr to 1,3-butadiene, b) addition of etheric to 1 butadiene (Diel's Afder reaction).

5. Aromatic Hydrocarbons and Aromaticity

Introduction, Nomenclature, kekule and resonance structure of benzene, slabile Orbital picture of benzene. Aromaticity and antiaromaticity by Huckel's & (Benzene, Napthalene, Anthracene, Pyrrrole, Furan, Thiophene, Pyride, Cyclopentadienyl cation and amon, Cyclopropenyl cation). Electrophilic Suisstians reaction of benzene (with mechanism): Natration, Halogenation, Friedel Craft alkylats, and acylation. Orientation effect: Effect of activating and deactivating groups (OR), CHs, CI) on aromatic electrophilic (Natration) substitution reaction to mechanism)

6. Phenols

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Introduction, classification and acidic character of phenol (compare with ethanol themical reactions with mechanism: Reimer-Tiemann reaction, Acetylation, Integrangement, Kolbe's carboxylation reaction.

7. Haloalkenes and Haloarenes

7.1 Haloalkenes

- a) Vinyl Chloride: synthesis of vinyl chloride from 11-1, 2- dichlorocthone ethene Chemical reactions: Addition reaction with HBr, polymeroamreaction.
- b) Allyl Indide: synthesis of allyl indide from 1) allyl chloride 2) glycerol and III. Chemical reactions: reaction with NaOH, KCN, & Br₂

7.2 Haloarenes:

Introduction, Synthesis of halobenzene from 1) Hunsdiecker reaction : Gattermann reaction Chemical reactions (with mechanism): Ullamann hard synthesis. Resonance & Relative reactivity of alkyl halides v/s vinyl and aryl halides towards nucleophilic substitution reactions.

Carboxylic acid derivatives

8.1 Acid Chlorides

Introduction, preparation methods. 1) From acetic acid and thionyl chloride, 2) From acetic acid and phosphorous pentachloride. Chemical reactions: (Hydrolysis, Action with alcohol, Action with amines).

8.2 Acid anhydrides

Introduction, preparation methods: 1) From acetyl chloride and carboxylic acid, 2) From acetyl chloride and sodium acetate. Chemical reactions: (Hydrolysis, Action with alcohol, Action with amines).

8.3 Esters

Introduction, preparation methods: 1) From ethyl alcohol and acetic acid, 2) From ethyl alcohol and acetyl chloride. Chemical reactions: (Hydrolysis, Action of amines, Reduction)

8.4 Amides

Introduction, preparation methods: 1) From ammonia and acetyl chloride 2) From ammonia and acetic anhydride. Chemical reaction: (Hydrolysis, Action of nitrous acid).

Alcohols and epoxides

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- a) Dihydric alcohol (ethylene glycol): Preparation methods: (Hydroxylation of alkene and From 1,2-dihaloalkane). Chemical reactions: [Reaction of ethylene glycol with, 1) Pb(OAC)₄, 2) P₂O₂/ZnCl₂],
- b) Trilhydric alcohol (Glycerol): Preparation methods from: 1) Oils and fats 2) Propene. Chemical reactions: [Reactions of glycerol with, 1) Nitrie acid, 2) Acetyl chloride].

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9.2 Epoxides

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