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Autore	Agrawal J. P (Jai Prakash)
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1.10.1 1,2-Addition Reactions; 1.10.2 1,4-Addition Reactions; 1.10.3 Mannich Reaction; 1.10.4 Henry Reaction; 1.11 Derivatives of Polynitroaliphatic Alcohols; 1.12 Miscellaneous; 1.12.1 1,1-Diamino-2,2-Dinitroethylenes; 1.12.2 Other Routes to Aliphatic Nitro Compounds; 1.12.3 Selective Reductions; 1.13 Chemical Stability of Polynitroaliphatic Compounds; 1.13.1 Reactions with Mineral Acids; 1.13.2 Reactions with Base and Nucleophiles; References; 2 Energetic Compounds 1: Polynitropolycycloalkanes; 2.1 Caged Structures as Energetic Materials; 2.2 Cyclopropanes and Spirocyclopropanes; 2.3 Cyclobutanes and Their Derivatives; 2.4 Cubanes; 2.5 Homocubanes; 2.6 Prismanes; 2.7 Adamantanes; 2.8 Polynitrobicycloalkanes; 2.8.1 Norbornanes; 2.8.2 Bicyclo[3.3.0]octane; 2.8.3 Bicyclo[3.3.1]nonane; References; 3 Synthetic Routes to Nitrate Esters; 3.1 Nitrate Esters as Explosives; 3.2 Nitration of the Parent Alcohol; 3.2.1 O-Nitration with Nitric Acid and Its Mixtures; 3.2.2 O-Nitration with Dinitrogen Tetroxide; 3.2.3 O-Nitration with Dinitrogen Pentoxide; 3.2.4 O-Nitration with Nitronium Salts; 3.2.5 Transfer Nitration; 3.2.6 Other O-Nitrating Agents; 3.3 Nucleophilic Displacement with Nitrate Anion; 3.3.1 Metathesis between Alkyl halides and Silver Nitrate; 3.3.2 Decomposition of Nitratocarbonates; 3.3.3 Displacement of Sulfonate Esters with Nitrate Anion; 3.3.4 Displacement with Mercury (I) Nitrate; 3.4 Nitrate Esters from the Ring-Opening of Strained Oxygen Heterocycles; 3.4.1 Ring-Opening Nitration of Epoxides; 3.4.2 1,3-Dinitrate Esters from the Ring-Opening Nitration of Oxetanes with Dinitrogen Pentoxide; 3.4.3 Other Oxygen Heterocycles; 3.5 Nitrodesilylation; 3.6 Additions to Alkenes; 3.6.1 Nitric Acid and its Mixtures; 3.6.2 Nitrogen Oxides

Sommario/riassunto

Organic Chemistry of Explosives is the first text to bring together the essential methods and routes used for the synthesis of organic explosives in a single volume. Assuming no prior knowledge, the book discusses everything from the simplest mixed acid nitration of toluene, to the complex synthesis of highly energetic caged nitro compounds. Reviews laboratory and industrial methods, which can be used to introduce aliphatic C-nitro, aromatic C-nitro, N-nitro, and nitrate ester functionality into organic compounds. Discusses the advantages and disadvantages of each synthetic m