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the Side-Chain; 2.2.6 Miscellaneous Methods; 2.2.6.1 Formation from Carbenes; 2.2.6.2 Phosphorylation of Compounds with an Active Methylene Group; 2.3 Chemical Properties; 2.3.1 Stability; 2.3.2 Transformations Accompanied by Cleavage of the P=C Bond; 2.3.2.1 Thermolysis; 2.3.2.2 Photolysis; 2.3.2.3 Oxidation-Industrial Synthesis of B-Carotene; 2.3.2.4 Reactions with Elemental Sulfur and Selenium; 2.3.2.5 Reduction; 2.3.3.6 Hydrolysis of Ylides; 2.3.2.7 Applications in Organic Synthesis; 2.3.3 Substitution at the Ylidic Carbon Atom; 2.3.3.1 Reactions with Alkylation Reagents; 2.3.3.2 Reactions with Acylation Reagents; 2.3.3.3 Examples in Natural Compound Synthesis; 2.3.4 Reactions with Compounds Containing Multiple Bonds; 2.3.4.1 Compounds Containing Carbon-Carbon Multiple Bonds; 2.3.4.2 Reactions with Compounds Containing Carbon-Heteroatom or Heteroatom-Heteroatom Multiple Bonds; 2.3.5 Reactions with 1,3-Dipolar Compounds. Synthesis of Heterocyclic Systems; 2.3.5.1 Reaction with Aziridines and Azomethine Ylides-Synthesis of Pyrrolines; 2.3.5.2 Oxides of Azomethines; 2.3.5.3 Azides-Synthesis of 1,2, 3-Triazoles; 2.3.5.4 Reaction with Nitrile Oxides. Nitrilimines and Nitrilylides - Synthesis of Pyrazoles and Isoxazoles; References; 3 Cumulene Ylides; 3.1 Introduction; 3.1.1 The Structure of Phosphacumulene Ylides; 3.2 Phosphaketene Ylides; 3.2.1 Chemical Properties; 3.2.2 Dimerization; 3.2.3 Addition of Compounds Bearing a Mobile Hydrogen Atom; 3.2.4 [2+2] Cycloaddition Reactions; 3.2.5 1,3-Dipolar Addition Reactions; 3.2.6 [4+2]-Cycloaddition Reactions; 3.2.7 Miscellaneous Reactions; 3.3 Phosphaketeneacetal Ylides; 3.4 Phosphaallene Ylides and Phosphacumulene Ylides; 3.5 Application in Natural Product Synthesis; 3.6 Carbodiphosphoranes; 3.6.1 Structural Studies of Carbodiphosphoranes; References; 4 C-Heterosubstituted Phosphorus Ylides; 4.1 Introduction; 4.2 Phosphorus Ylides Substituted on the  $\alpha$ -Carbon by Atoms of Element Groups I-IV; 4.2.1 Ylides Containing Group 1A and IIA Elements; 4.2.2 Ylides Containing Group IIIA Elements; 4.2.3 Ylides Containing Group IVA Elements

## Sommario/riassunto

When Wittig first developed and described phosphorus ylides, nobody could have imagined how useful and versatile this class of compounds could be. This book provides a comprehensive and up-to-date compilation of the chemistry and applications of phosphorus ylides in organic synthesis. The ylides are discussed as reagents in the synthesis of a broad range of substances, amongst them olefins, acetylenes, cyclic and heterocyclic compounds, in such naturally occurring compounds as pheromones, steroids and carotenoids, and pharmaceutically and biologically active compounds such as antibiotics and p