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Peroxide by Multiple Hydrogen Bond Networks
3.4.1 Hydrogen Bond Donor Features of HFIP3.4.2 The Catalytic Activity of HFIP in the Epoxidation Reaction; 3.5 TADDOL-Promoted Enantioselective Hetero-Diels-Alder Reaction of Danishefsky's Diene with Benzaldehyde-Another Example for Catalysis by Cooperative Hydrogen Bonding; 3.6 Epilog; References; 4: Oxyanion Holes and Their Mimics; 4.1 Introduction; 4.1.1 What are Oxyanion Holes?; 4.1.2 Contributions of Oxyanion Holes to Catalysis; 4.1.3 Properties of Hydrogen Bonds of Oxyanion Holes; 4.2 A More Detailed Description of the Two Classes of Oxyanion Holes in Enzymes
4.2.1 A Historical Perspective4.2.2 Oxyanion Holes with Tetrahedral Intermediates; 4.2.3 Oxyanion Holes with Enolate Intermediates; 4.2.3.1 Examples of Enolate Oxyanion Holes; 4.3 Oxyanion Hole Mimics; 4.3.1 Mimics of Enzymatic Oxyanion Holes and Similar Systems; 4.3.2 Utilization of Oxyanion Holes in Enzymes for Other Reactions; 4.4 Concluding Remarks; Acknowledgments; References; 5: Brønsted Acids, H-Bond Donors, and Combined Acid Systems in Asymmetric Catalysis; 5.1 Introduction; 5.2 Brønsted Acid (Phosphoric Acid and Derivatives); 5.2.1 Binapthylphosphoric Acids; 5.2.1.1 Mannich Reaction
5.2.1.2 Hydrophosphonylation5.2.1.3 Friedel-Crafts; 5.2.1.4 Diels-Alder; 5.2.1.5 Miscellaneous Reactions; 5.2.1.6 Nonimine Electrophiles; 5.2.1.7 Transfer Hydrogenation; 5.2.2 Nonbinol-Based Phosphoric Acids; 5.2.3 N-Triflyl Phosphoramide; 5.2.4 Asymmetric Counteranion-Directed Catalysis; 5.3 N-H Hydrogen Bond Catalysts; 5.3.1 Guanidine Organic Base; 5.3.2 Ammonium Salt Catalysis; 5.3.3 Chiral Tetraaminophosphonium Salt; 5.4 Combined Acid Catalysis; 5.4.1 Brønsted-Acid-Assisted Brønsted Acid Catalysis; 5.4.1.1 Diol Activation of Carbonyl Electrophiles
5.4.1.2 Diol Activation of Other Electrophiles

Sommario/riassunto

This first comprehensive overview of the rapidly growing field emphasizes the use of hydrogen bonding as a tool for organic synthesis, especially catalysis. As such, it covers such topics as enzyme chemistry, organocatalysis and total synthesis, all unified by the unique advantages of hydrogen bonding in the construction of complex molecules from simple precursors.Providing everything you need to know, this is a definite must for every synthetic chemist in academia and industry.

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