

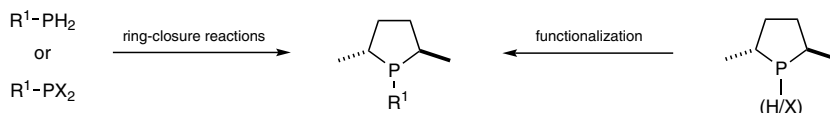
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42.6.6 Cyclic Phosphines

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This is an update to the earlier *Science of Synthesis* contribution (Section 42.6) describing methods for the synthesis of cyclic phosphines. Thus, the focus is on secondary and tertiary phosphines with a phosphorus atom that is part of a saturated or partially unsaturated ring. Significant developments published in the period 2008 to 2019 are reviewed.



Keywords: cyclization · cycloaddition · fused-ring systems · organophosphorus compounds · phosphines · phosphorus heterocycles · phosphorus ligands

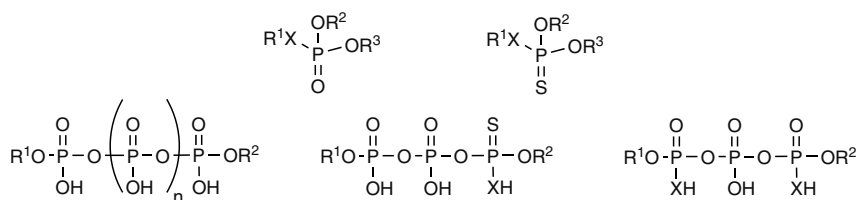
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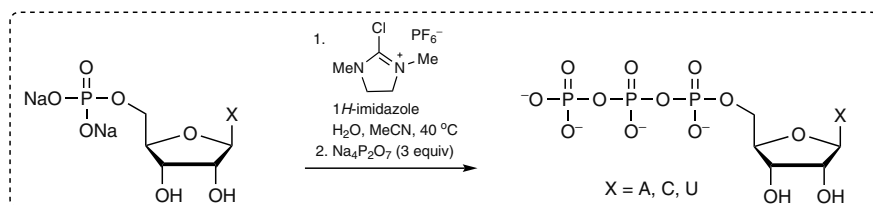
42.16.4 Phosphoric Acid and Derivatives

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The methods presented here are mainly based on those reported since the original *Science of Synthesis* chapter on this topic (Section 42.16), published in 2009. The phosphoric acid derivatives covered include P=O compounds (e.g., phosphates, *S*-alkyl phosphorothioates, diphosphates, and triphosphates) and P=S compounds (*O*-alkyl phosphorothioates, etc.). Emphasis is placed on the synthesis of biologically relevant compounds, particularly nucleotides, oligonucleotides, phosphorylated sugars, and lipids.



X = O, S; R¹, R², R³ = H, alkyl, nucleoside, sugar, lipid, etc.



Keywords: organophosphorus compounds · phosphoric acids · phosphates · phosphorothioates · diphosphates · triphosphates · nucleosides · nucleotides · oligonucleotides · sugars · lipids · triphosphorodithioates · triphosphorothioates · dithiophosphates · phosphorothioates · bisphosphonates · bromotrimethylsilane · silyldealkylation · McKenna reaction

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Updated Section ·

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Completely Revised Contributions ·

New

New Contributions