**Crafting Bio-active Sulfur-Containing Molecules: A Sustainable Approach**

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Sulfur-containing molecules are important skeletons in organic synthesis and pharmacetical industry.1 Phosphate esters are crucial in organic synthesis as they are present in biologically active moieties and serve as versatile intermediates in amide synthesis. Phosphorodithioates2-4 are well-known as antiviral agents, plant growth regulators, enzyme inhibitors, and lubricants. However, the known procedures for preparing phosphorodithioates suffer from several drawbacks, such as the use of toxic reagents, harsh reaction conditions, limited substrate scope, and the involvement of air-sensitive reagents. Therefore, the synthesis of phosphorothioates under milder and more environmentally friendly conditions is highly desirable. Cross-dehydrative coupling (CDC) reactions have attracted significant attention for their ability to enhance reaction efficiency and improve atom economy. However, the oxidative CDC of thiols and phosphonates to form P-S bonds remains challenging because the P-H and S-H bonds are readily oxidized by stoichiometric oxidants. Molecular oxygen (O2), an environmentally friendly and ideal oxidant, is widely used in organic synthesis. Here, we present a simple Cs2CO3-catalyzed aerobic oxidative cross-dehydrative coupling of thiols and phosphonates for the synthesis of dithiophosphates. This method, characterized by mild reaction conditions, excellent functional group tolerance, and broad S-H and P(S)-H substrate scope, offers a valuable protocol for organic synthesis.4

Reference

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