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Thiolo-phosphohydrides: New Reagents in the Organo-Phosphorus Synthesis

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THIOLOPHOSPHOHYDRIDES: NEW REAGENTS IN THE ORGANO- PHOSPHORUS SYNTHESIS

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A simple and effective method has been developed for synthesizing a new type of organophosphorus compounds, thiolo-phosphohydrides, with the general formula $R(R'S)PH$ based on the selective reduction of thioesters of P(III) acids by di- or trialkylstannanes. Stable S-alkylalkylthiophos-phonites and S-alkylalkyldithiophosphonites have been obtained for the first time by using the processes of oxidation and sulfurization. The functionally substituted phosphorus (III) thio derivatives have been obtained by the addition reactions of thiolo-phosphohydrides with compounds containing carbon-carbon and carbon-oxygen multiple bonds, with the cleavage of the P-H bonds and the preservation of P-S bonds. Factors affecting the rate of interaction, stability and the structure of additional products have been elucidated. Depending on the reaction conditions of thiolo-phosphohydrides with halogen containing electrophilic re-agents and on the nature of the latter, the process can lead to the cleavage either of the P-H bond or the P-S bond. Thiolo-phosphohydrides as new reagents in organophos-phorus synthesis open up new vistas for obtaining a variety of functionally substituted phosphor- and sulfur-containing compounds.