

The Organophosphorus Sulfenyl Bromides as Versatile Reagents for Cysteine Derivatives Functionalization by Unsymmetrical Disulfide Bond Formation

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We have developed a convenient method for the synthesis of L-cysteine unsymmetrical disulfides under mild conditions with good to excellent yields. Described method is based on the straightforward preparation of the organophosphorus sulfenyl bromide readily available from bis-(5,5-dimethyl-2-thiono-1,3,2-dioxaphosphorinanyl) disulfide. The unsymmetrical disulfides can be obtained for L-cysteine derivatives and thiols bearing neutral or acidic functionalities.

Keywords L-cysteine; sulfenyl bromide; thiols; unsymmetrical disulfides

INTRODUCTION

Recently, we have discovered that readily available S-thioacyl dithiophosphates are excellent thioacylating agents. These mixed anhydrides chemoselectively thioacylated nitrogen or sulfur nucleophiles in the presence of hydroxyl groups. That property allowed to obtain hydroxythioamides, hydroxydithioesters, and thiohydroxamic acids as well, from nonprotected substrates on oxygen atom.^{1–4} We were encouraged by those results, so we decided to design a synthetic strategy for preparation of unsymmetrical disulfides based on the mixed anhydrides of dithiophosphoric acids. Disulfides are important compounds for both chemical and biological processes.^{5,6} There are many biologically active L-cysteine derivatives, peptides and peptide mimetics possess unsymmetrical disulfide bonds.⁷ The new efficient strategy for preparation of L-cysteine unsymmetrical disulfides is based on the organophosphorus

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