

Trityl Chloride: As a multi propose reagent

Compiled by Mahmoud Zarei

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This feature focuses on a reagent chosen by a postgraduate, highlighting the uses and preparation of the reagent in current research.

Introduction

Various reagents have been reported which have trityl chloride moiety in their molecular structure such as: trityl bromide, aziridine, borate, ether, thiol, ester, sulfide and resins [1]. Triphenylmethyl chloride is commercially available. It may be prepared by the reaction of triphenylmethanol with acetyl chloride (Scheme 1), or by the Friedel-Crafts alkylation of benzene with carbon tetrachloride to give the trityl chloride-aluminium chloride adduct, which is hydrolyzed [2]. Triphenyl methyl chloride or trityl chloride (TrCl) is a white solid with the chemical formula $C_{19}H_{15}Cl$. Sometimes TrCl as an alkyl halide, used to give trityl protecting group. It has been applied as a reagent and/or catalyst in the manufactory [1].

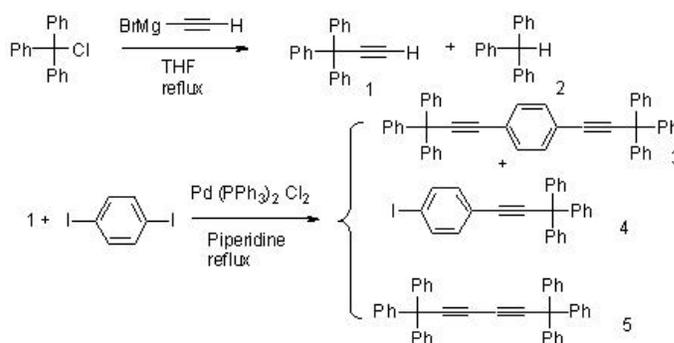
This compound has been also extensively studied as a bulky protective group for amino and primary hydroxyl functional groups in multi-step organic synthesis [3]. Furthermore, triaryl methyl chloride in combination with metal salts particularly $SnCl_2$ has been used in a few organic transformations [4]. Nevertheless, the use of this compound in the absence of co-catalysts is really attractive. TrCl has been used for the synthesis of various organic compounds such as: 1,4-bis(3,3,3-triphenylpropynyl)-benzene [5], 6-Chloro- and 2,6-Dichloro-9H-purine [6], 1-amido-alkyl-2-naphtols [7], biosensors carbohydrates [8] and protecting group [9].



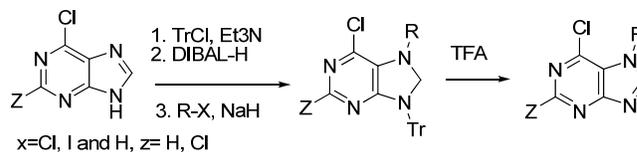
Scheme 1. The preparation of TrCl.

Abstracts

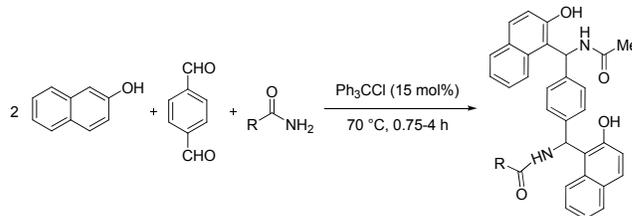
(A) Zaira Dominguez *et.al*, using coupling reaction, described an efficient and convenient method for the synthesis of 1,4-bis(3,3,3-triphenylpropynyl)-benzene by the reaction of 3,3,3-triphenylpropyne, produced by the reaction of trityl chloride and prop-1-yn-1-yl magnesium bromide, with 1,4 diiodo benzene in the presence of catalyst (Pd(0)-catalyzed). Pd(0) has been applied for coupling reaction of 2.5 equiv of alkyne **1** with 1,4-diiodobenzene in refluxing in piperidine to yield rotors and so on [5].



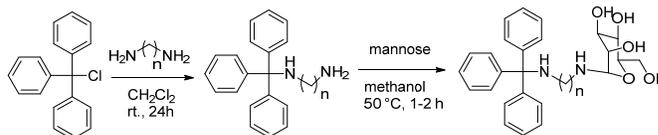
(B) Trityl chloride has been used as a source of safekeeping for the synthesis of various altogether transformation of 6-chloro- and 2,6-dichloro-9*H*-purine to 7-substituted purines moieties in excellent yields [6].



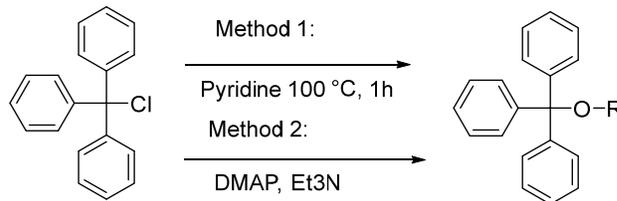
(C) Trityl chloride, was used for the one-pot multi-component reaction of β -naphthol with aldehydes and different amids under solvent-free conditions to afford 1-amido-alkyl-2-naphthols, in high yields and short reaction times. Interestingly, trityl chloride by the *in situ* generation of trityl carbocation with inherent variation impressive as a reusable homogenous organocatalyst catalyzed the reaction under natural media [7].



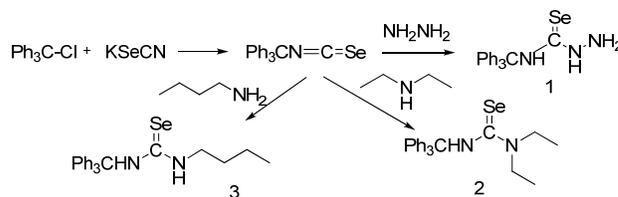
(D) Biosensors carbohydrates, for a comprehensive review and high-throughput protein-carbohydrate interactions, are used. One such approach is the preparation of carbohydrate derivatives with a trityl group, the alkyl linker and immobilization of carbohydrate trityl derivatives (mannose and maltose) on microplates noncovalently to build an array of carbohydrate. Here is a convenient protocol for the synthesis of carbohydrates strong noncovalent microplates are offered in an array that has been employed in drug screening [8].



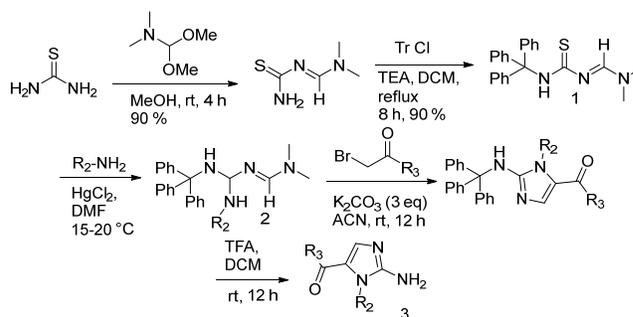
(E) The triphenylmethyl (trityl) group is a common protecting group for hydroxyls, being easily introduced and successively removed by mild acidic treatment. Trityl ethers were prepared in solution in a matter of minutes by treating trityl chloride with silver triflate in the presence of alcohols. Yields were comparable or better than known literature methods. This method was compatible with the base-labile Fluorenylmethoxy carbonyl (Fmoc) protecting group of amino alcohols and adapted for trityl protection of halo-containing alcohols [9].



(F) Trityl isoselenocyanate, by the reaction of trityl chloride with KSeCN is synthesized. This intermediate can react with hydrazine, primary and secondary amines, primary and secondary amines, to give trityl selenosemicarbazide, selenourea derivatives and selenoureas and substitution products are formed which are produced by various manufacturers [10].



(G) Convenient synthesis of 2-amino-1,5-disubstituted and 2-amino-1,4,5-trisubstituted imidazoles has been reported using readily available starting materials and simple reagents under mild conditions. Guanylation of 1-amidino-3-trityl-thioureas **1** using mercury(II) chloride (Caution) as a thiophile resulted in corresponding guanidines **2** which on reaction with α -bromo ketones yielded 2-tritylaminoimidazoles. Deprotection of 2-tritylaminoimidazoles using trifluoroacetic acid at room temperature furnished 2-aminoimidazoles **3** in good to moderate yields [11].



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