SYNLETT Spotlight 24

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

Triphosgene

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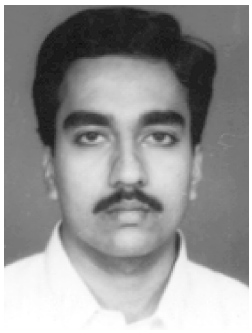
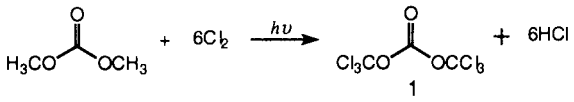
I completed my Bachelor (B. Sc, 1995) and Masters (M. Sc, 1997) degree in chemistry from Vivekananda College (University of Madras), Chennai, India. I am currently working as a CSIR-JRF for my Ph. D. under the supervision of Dr. A. R. A. S. Deshmukh at the Division of Organic Synthesis, National Chemical Laboratory, Pune, India.



The synthetic utility of triphosgene or bis(trichloromethyl)carbonate has been extensively investigated in the last decade. It has now become a versatile synthetic tool in the preparation of many classes of organic compounds. It is a white crystalline solid (mp = 80 °C),[1] soluble in common organic solvents like CH_2Cl_2, THF, ether, chloroform. Being a solid, it is easier and safer to handle than its gaseous cogener, phosgene. Reactions with triphosgene can be carried out under mild conditions to get excellent yields of products.

Preparation Triphosgene (**1**) is prepared by photochlorination of dimethyl carbonate.[2]



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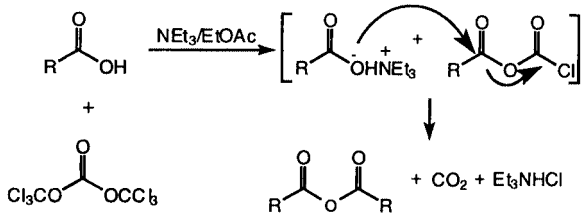
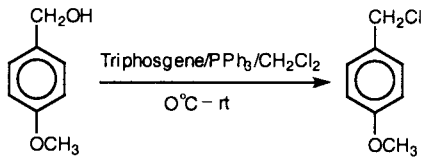
Abstracts

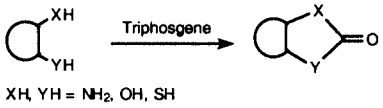
1. It is a convenient reagent for preparing acid chlorides and anhydrides[3] from carboxylic acids.



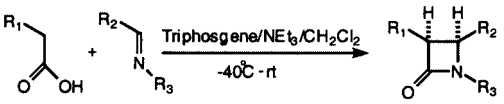
2. Chlorination of primary and secondary alcohols to alkyl chlorides can be carried out using triphosgene and triphenylphosphine.The reaction can be performed at an ambient temperature to get excellent yields of alkyl chlorides.[4]



3. Triphosgene is used for protecting diols, aminols, thiols, etc.[5a-c]



4. Triphosgene acts as an efficient acid activator for β- lactam synthesis via ketene- imine cyclisation reaction (Staudinger Reaction).[6]



References and Notes

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