

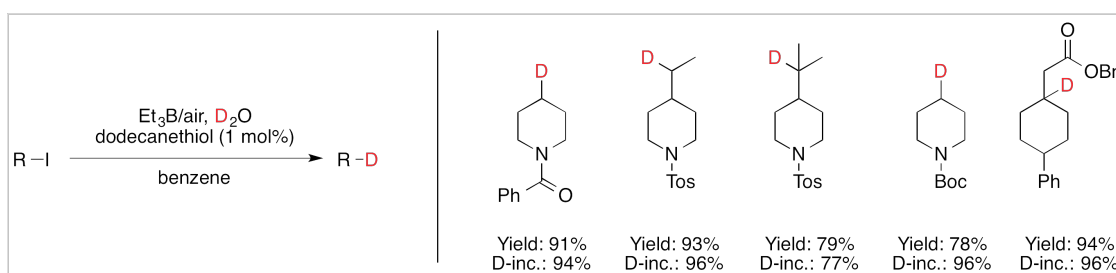
Radical Deuteration of Alkyl Iodides Catalyzed by Thiol and Mechanistic Studies on Deoxygenation Reactions of Xanthates

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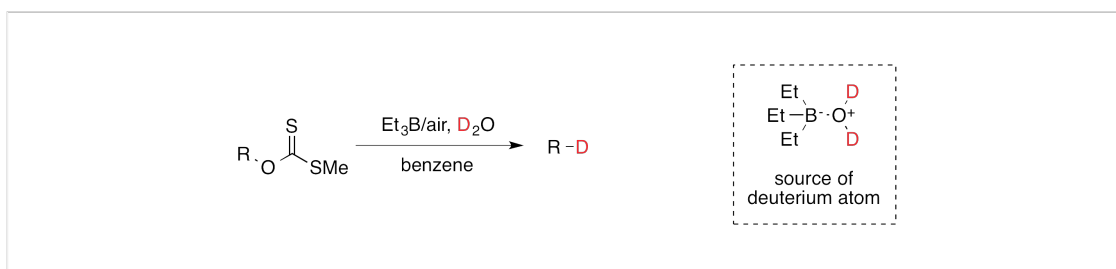
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Recently, there has been a growing interest in the pharmaceutical industries to incorporate deuterium in drugs candidates to improve their metabolism and pharmacokinetic properties¹. A significant number of deuterated drug candidates (heavy drugs) have been synthesized and forwarded to clinical trials, such as Deutetrabenazine (Austedo®, TEVA pharmaceuticals) which is the first deuterated drug on the market. However, preparation of organic compounds selectively labelled with deuterium atom, remains a challenging synthetic problem. Radical deuteration of alkyl halides is one of the most efficient approach to perform this task. It is usually run using organotin deuterides² but this method has three major drawbacks: organotin deuterides are expensive, toxic³ and led to product contamination.

We report here a method to deuterate alkyl iodides via a radical pathway with deuterated water as source of deuterium atom. Triethylborane is used to initiate and propagate the chain and dodecanethiol is used as a catalyst⁴. High deuterations and yields are obtained using this method which is compatible with a large range of functional groups.



The development of the deuteration method led us to discoveries that incite us to reinvestigate the mechanism of xanthates deoxygenation described by Wood *et al.*⁵ (see below) who used heavy water activated by trialkylboranes as a source of deuterium atom.



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