Chem 342 Organic Chem II

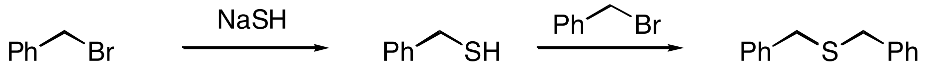
Lecture Summary 25
22 Mar 2002

These notes can be obtained at: http://www.ndsu.nodak.edu/instruct/grcook/chem342/notes.shtml

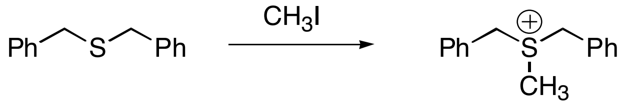
Chapter 18: Ethers and Epoxides; Thiols and Sulfides

Preparation and Reactions of Thiols and Sulfides

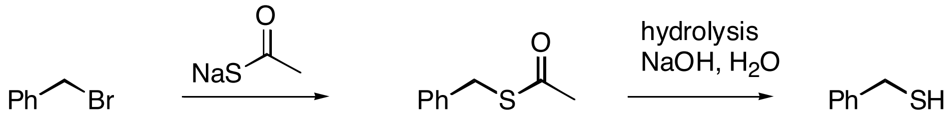
Sulfur is generally more nucleophilic than oxygen. It is very easy to alkylate sulfur compounds with electrophiles. Less reactive sulfur nucleophiles are often used to prevent over alkylation.



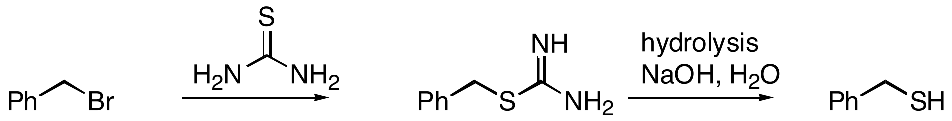
difficult to stop here



Alkylation of sulfides with reactive electrophiles is very facile.

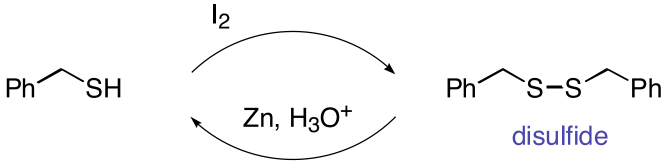


less reactive than thiol

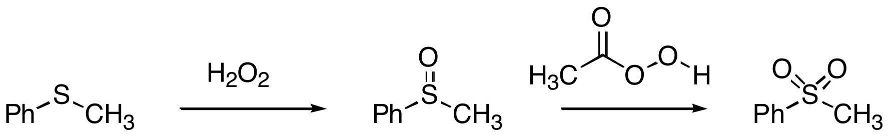


less reactive than thiol

Thiols can be oxidized readily to disulfides. This is easily reversed by reduction with Zn.



Sulfides can be oxidized to sulfoxides or sulfones.



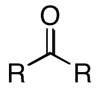
a sulfoxide

a sulfone

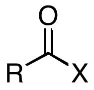
Chapter 19: Aldehydes and Ketones: Nucleophilic Addition Reactions

Carbonyl Compounds

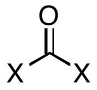
Carbonyl compounds exist in three different oxidation states.



aldehydes
ketones

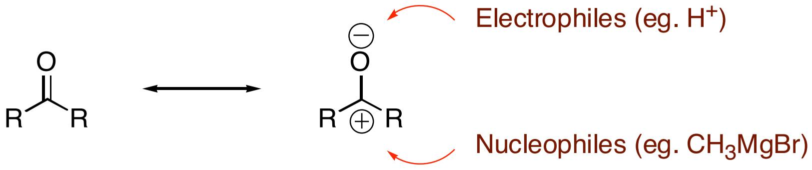


carboxylic acid
and derivatives

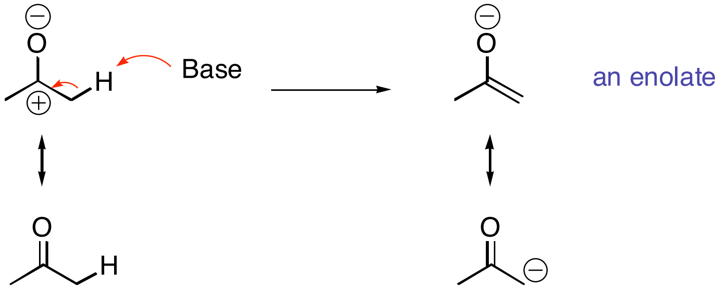


carbonic acid
and derivatives

Carbonyls are polarized toward the oxygen. Thus, nucleophiles will react at the carbon and electrophiles at the oxygen.



The α-position of carbonyls is more acidic than typical alkanes due to the electron withdrawing affect of the carbonyl carbon. Thus, enolates can be readily prepared with suitable bases. These represent another class of carbon nucleophiles.



Preparation of Aldehydes and Ketons

Aldehydes and ketones can be prepared by the oxidation of alcohols. For aldehydes, only PCC will stop at the aldehyde oxidation state. Other oxidants will oxidize all the way to the carboxylic acid. Ozonolysis of alkenes is also a good way to prepare carbonyl compounds.