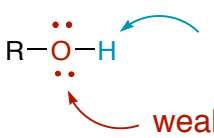
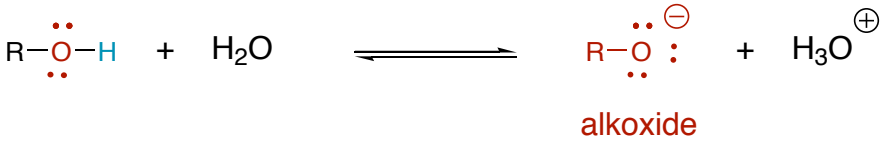
Chapter 17 - Alcohols and Phenols

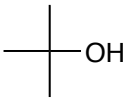
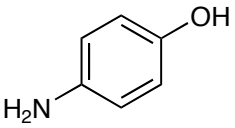
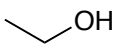
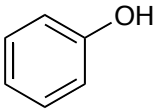
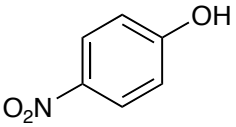
Properties of Alchols

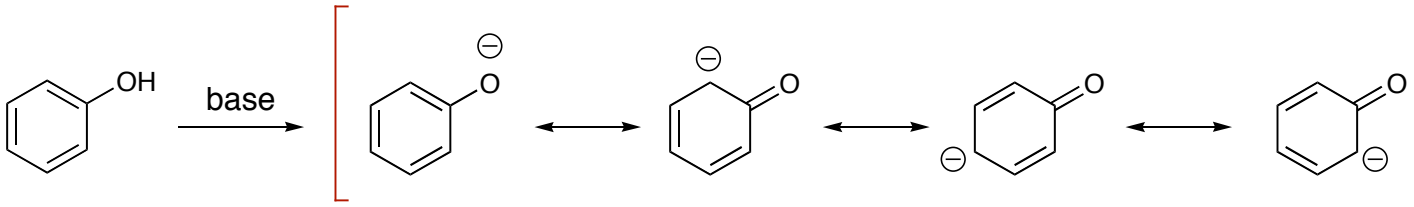
Alcohols can be weakly acidic or weakly basic. The amount of solvent stabilization, inductive effects and resonance effects will influence the acidity of alcohols. Some pK_a values for various alcohols are listed below. Notice the phenols are much more acidic than normal alcohols. This is due to resonance stabilization of the negative charged formed after deprotonation.





$$K_a = \frac{[RO^-]\,[H_3O^+]}{[ROH]} \qquad pKa = -\log Ka$$

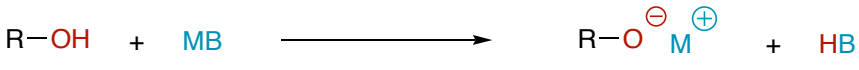
	pK_a		pK_a		pK_a
	18.0	CH_3OH	15.5		10.5
	16.0	CF_3CH_2OH	12.4		
HOH	15.7		9.9		7.2



phenoxide is more stable than alkoxide

Deprotonation of Alchols

Alcohols need a pretty strong base to be deprotonated. With the exception of phenols, alcohols will not be deprotonated with hydroxide. Strong bases like sodium hydride, sodium amide, or reactive organometallics are generally used. Phenols can be deprotonated with NaOH as they are 10^6 times more acidic than alkanols.



an alkoxide ion

Preparation of Alchols

Alcohols can be prepared by three general reaction types: substitution of alkyl halides, reduction of carbonyl compounds, and addition to alkenes.