

Summary

The conjugate base of a carbonyl compound, an enolate, is generated under basic conditions. Enolates are nucleophilic at the α -carbon (and at oxygen). Enolates are better nucleophiles than enols. They react with alkyl halides (alkylation) by the $[S_N2]$ mechanism. They react with α,β -unsaturated carbonyl compounds to give conjugate addition products (another version of the Michael reaction).

Enolates can be prepared quantitatively by deprotonation with a strong base such as lithium diisopropylamide (LDA).

Enols are good nucleophiles that can be generated under acidic conditions. Under acidic conditions, carbonyl compounds are thus electrophilic at the carbonyl C and nucleophilic at the α -carbon (and also at oxygen).

Enols react with electrophiles (e.g., bromine) leading to net substitution of one α -hydrogen by the electrophilic atom(s).

Enols are particularly reactive toward electrophilic alkenes such as α,β -unsaturated carbonyl compounds to give conjugate addition products (the Michael reaction). This is one of the mildest, most versatile, and most efficient methods for forming C-C bonds.