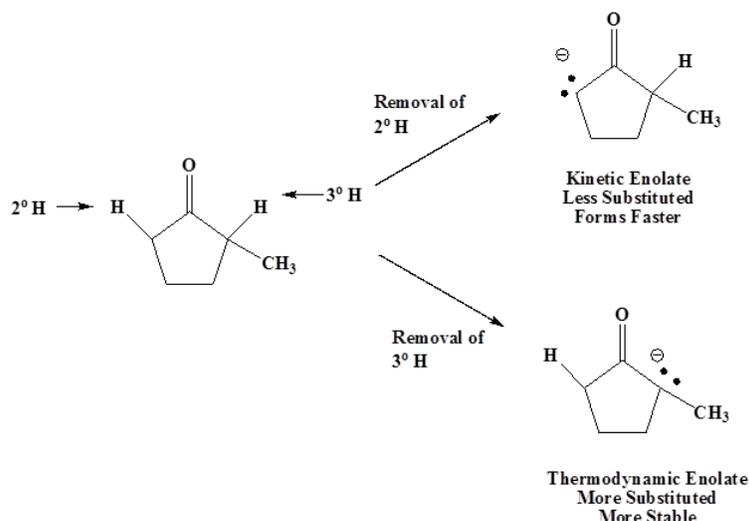


21.5: Enolates of Unsymmetrical Carbonyl Compounds

Enolate of Unsymmetrical Carbonyl Compounds

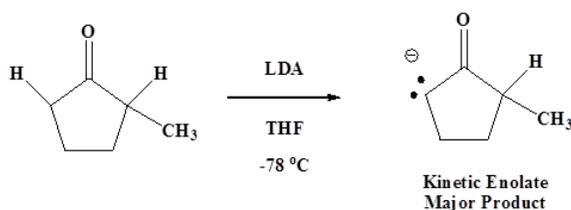
Now let's consider what happens when an unsymmetrical carbonyl is treated with a base. In the case displayed below there are two possible enolates which can form. The removal of the 2° hydrogen forms the kinetic enolate and is formed faster because it is less substituted and thereby less sterically hindered. The removal of the 3° hydrogen forms the thermodynamic enolate which is more stable because it is more substituted.



Kinetic Enolates

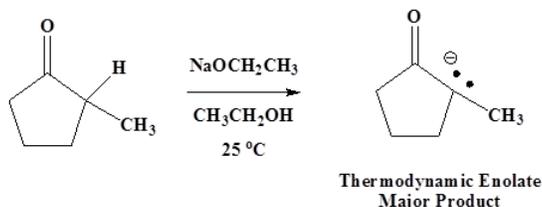
Kinetic enolates are formed when a strong bulky base like LDA is used. The bulky base finds the 2° hydrogen less sterically hindered and preferably removes it.

Low temperatures are typically used when forming the kinetic enolate to prevent equilibration to the more stable thermodynamic enolate. Typically a temperature of $-78\text{ }^{\circ}\text{C}$ is used.



Thermodynamic Enolates

The thermodynamic enolate is favored by conditions which allow for equilibration. The thermodynamic enolate is usually formed by using a strong base at room temperature. At equilibrium the lower energy of the thermodynamic enolate is preferred, so that the more stable, more substituted enolate is formed.



Contributors

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