

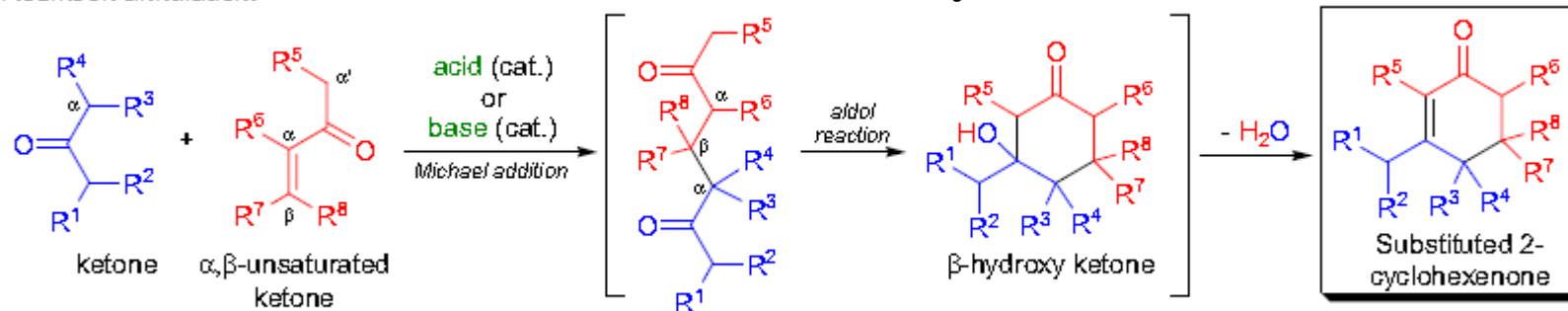
Robinson Annulation



1886.09.13~1975.02.08

Nobel Prize for Chemistry (1947)

Robinson annulation:

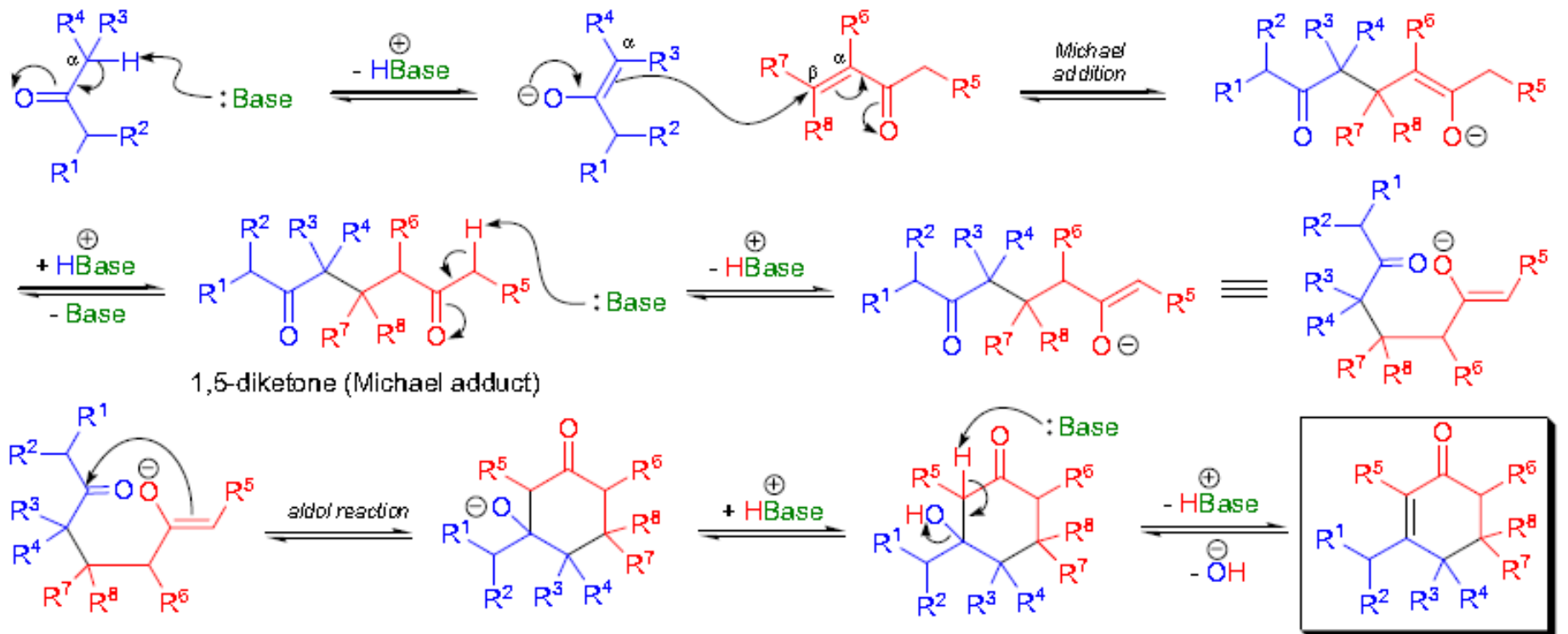


$R^{1-4} = H, \text{ alkyl, aryl}; R^5 = H, \text{ alkyl, aryl}; R^6 = H, \text{ alkyl, aryl, SiR}_3; R^{7-8} = H, \text{ alkyl, aryl}$

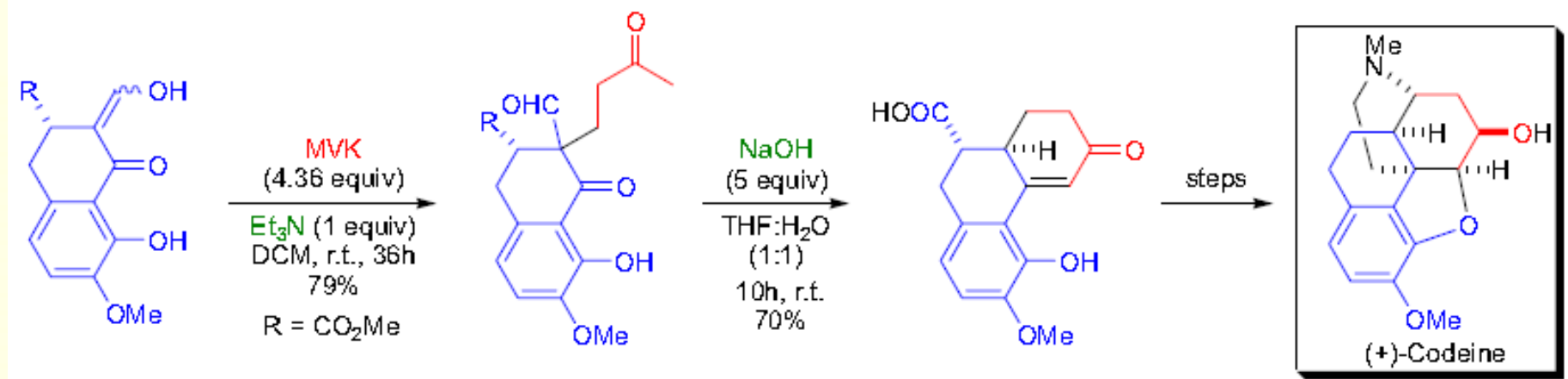
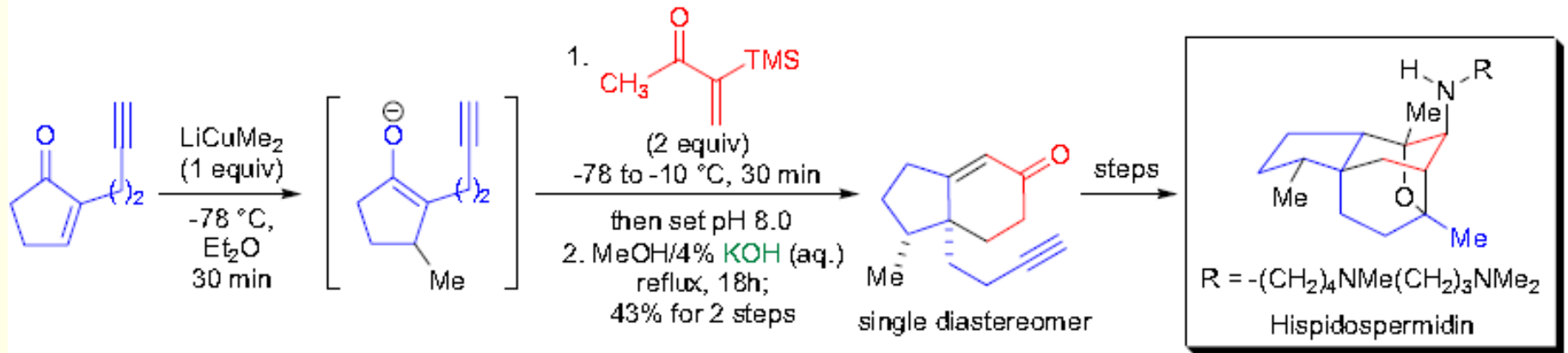
Features

1. combination of *Michael addition*, *intramolecular aldol reaction*, and dehydration;
2. It can be both acid- and base-catalyzed
3. Acyclic enones and cyclic ketones afford bicyclic enones, whereas cyclic enones and cyclic ketones give rise to polycyclic fused enones;
4. Methyl vinyl ketone (MVK) and its various derivatives and surrogates are used most often as the enone component;
5. yields tend to be higher when the Michael adduct is isolated and then subjected to the *aldol reaction*;
6. the alkylation of an unsymmetrical ketone occurs regioselectively at the most substituted α -position unless severe steric interference dictates otherwise;
7. regioselective cyclization can also be achieved by using preformed enolates or enamines under non-equilibrium conditions;
8. the annulation can generate as many as five stereocenters, but in the dehydration step two of these chiral centers are lost;
9. the relative stereochemistry between R3 and R7 (*cis* or *trans*) is dependent on the reaction conditions (e.g., solvent)
10. the enantioselective version is known as the *Hajos-Parrish reaction*

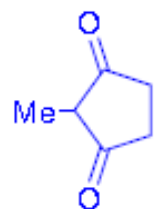
Mechanism



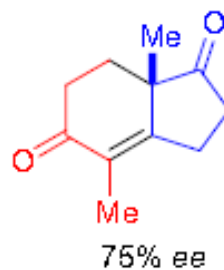
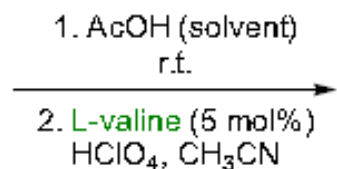
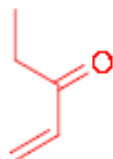
Applications



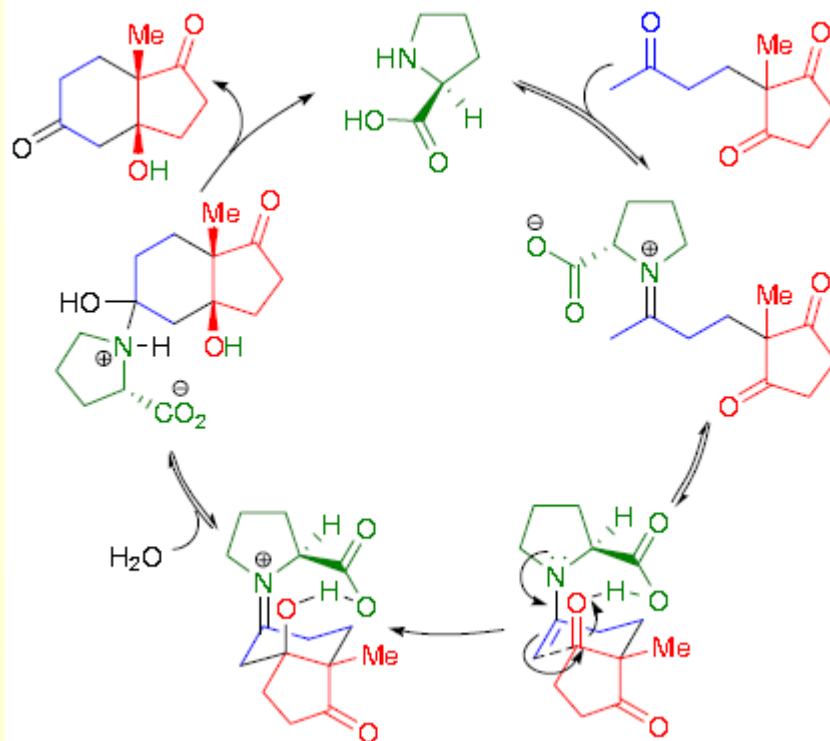
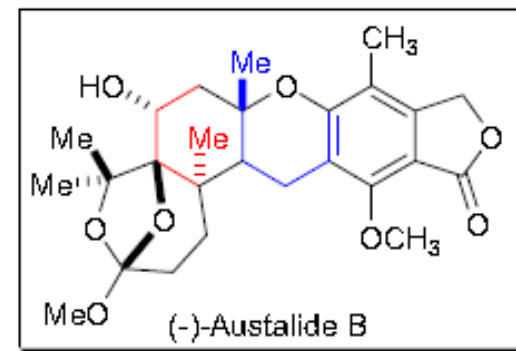
Applications



+



steps



**Mechanism of
Hajos-Parrish reaction**

Applications

