GENERAL REACTIVITY PATTERNS

In the following pictures, a number of anions are added to a simple carbonyl compound, a ketone (2-propanone, or acetone). In each case, addition of the nucleophile is followed by addition of a proton source. Note that, overall, the reaction involves addition of the nucleophile to the carbonyl carbon and addition of the proton to the carbonyl oxygen.

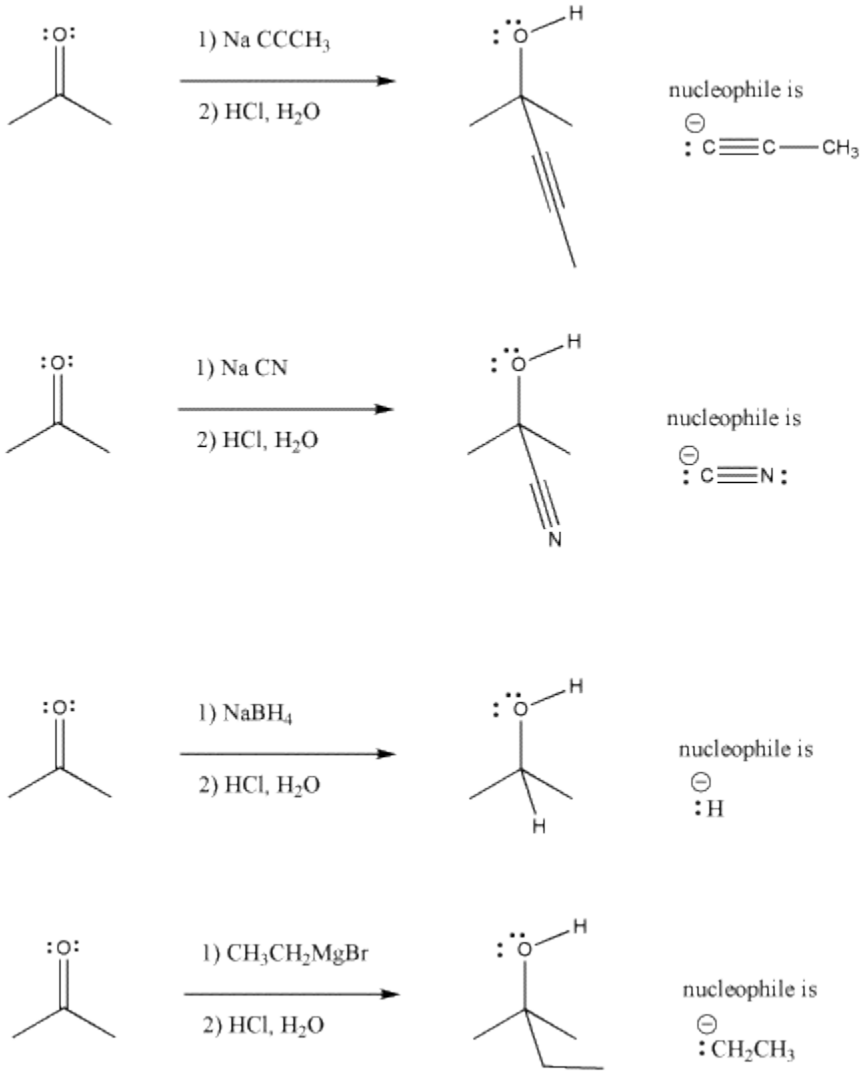

Figure CO2.1. Addition of some anionic (and "semi-anionic") nucleophiles to a ketone.

- Addition of anionic nucleophiles to ketones or aldehydes transforms the carbonyl into an alcohol.

Look at the way the reaction is presented in each case. The organic (carbon-based) starting material is presented on the left hand side of the reaction arrow. The reagent added to this starting material is often shown over the arrow. This reagent transforms the starting material into something else. That something else, the product, is shown to the right of the arrow.

Very often, the solvent for the reaction is shown underneath the arrow. The solvent is the liquid that is used to dissolve the starting material and reagents. This is done for a number of reasons. First, reactions generally happen much more quickly in solution than they do without a solvent. When dissolved, the reactants can move around more easily and bump into each other, as if they are swimming. Also, most useful reactions generate heat, and the solvent acts as a heat sink, carrying the excess heat away. (People who have not thought about the importance of solvent sometimes accidentally start fires as a result.) However, there are exceptions, and not all reactions need solvent.

These reactions shown above do need solvent, but the solvent is not shown for other reasons. These reagents must be added in a particular order: first the nucleophile and then the base. The nucleophile and base cannot be allowed to mix before the nucleophile has a chance to react with the carbonyl.

Source : http://employees.csbsju.edu/cschaller/Reactivity/carbonyl/COgeneral.htm