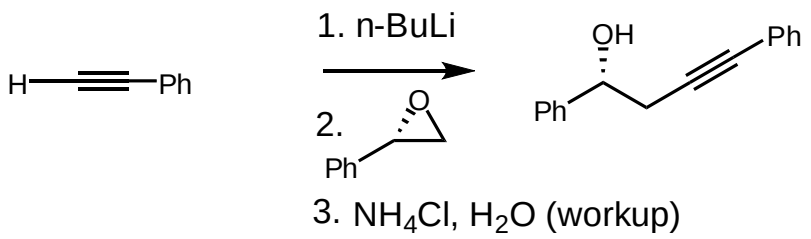
Problem 8



1. Draw all of the bonds near the reactive atoms in the starting materials

2. Draw all of the H-atoms at or near the reactive sites of the starting materials and the products

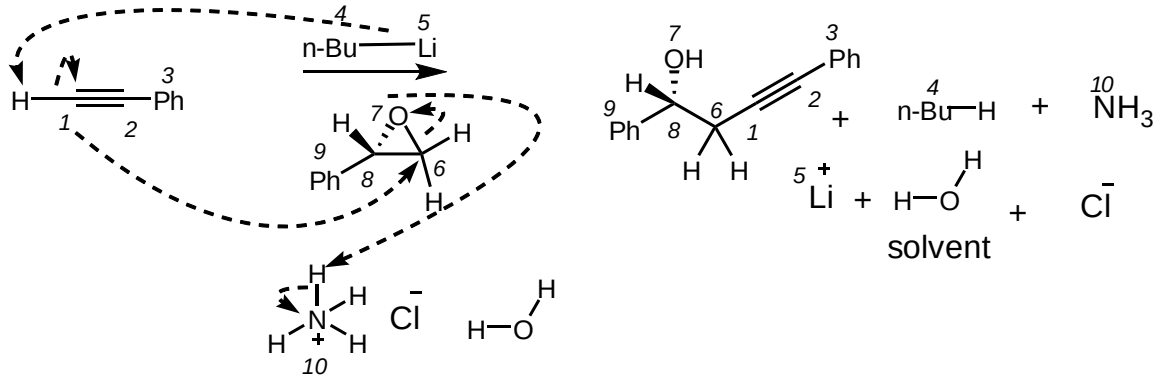
3. Balance the equation

4. Number the non-H atoms

5. Identify the bonds made and broken

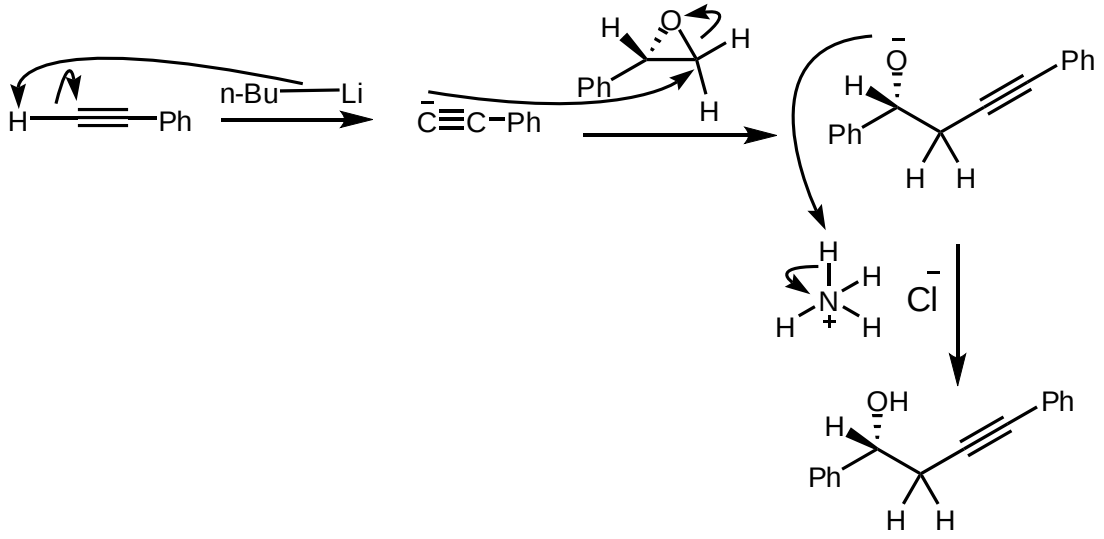
Bonds made: 1-6, 4-H, 7-H.

Bonds broken: 1-H, 4-5, 6-7, 10-H.



Identify the conditions
Basic (do not generate strong acids)

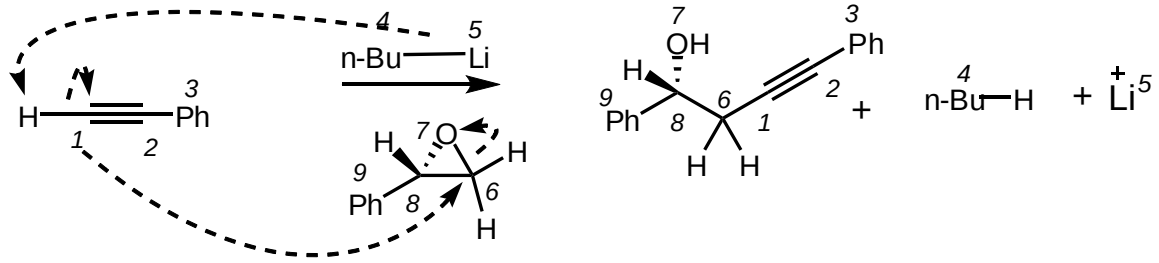
Mechanism



Discussion

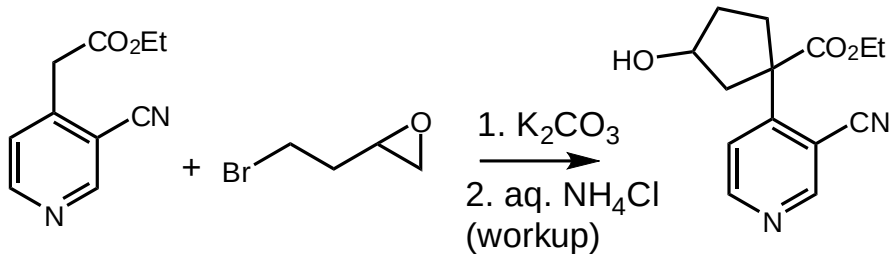
1. The last step of the reaction is an example of a mild acidic "workup". The workup is generally carried out to neutralize the reaction. The workup, for basic reactions requires the addition of an acid, and a workup of acidic reaction requires the addition of a base. Many times water is enough to do this job.
In organic literature, a workup is usually not mentioned into the chemical equation. It is assumed that products have undergone necessary acid or basic workups. If at the end of a mechanism, a charged species is present and the product should be neutral, assume appropriate workup.

2. Notice, although the last step is acidic, basic conditions have been mentioned for the reaction. This is because the last step is the workup. The workup should not be used in the identification of reaction conditions. From now on, we will not even include it in the balancing of equations. As such, it is expected that the charges and H atoms (mostly just one) will not be equal in our equation (see below).



3. In the first step of the mechanism, a carbanion is shown. In many places you will instead see a species with the counter ion attached. For example, in the above case it will be Li—≡—Ph. Both styles are suitable. It is understood that a naked carbanion must have a cation attached at an anionic position. Both styles will be used in this book.

Now try the following reaction.



Ref. A. S. Kende and T. P. Demuth, Tetrahedron Lett., 1980, 21, 715-718.