

Summary

Many carbonyl compounds including esters, acyl chlorides, and acid anhydrides have leaving groups attached to the carbonyl C, and many reactions proceed with substitution of this leaving group by a nucleophile.

Substitutions at the carbonyl C usually occur by an addition-elimination mechanism. The nucleophile (Nu^-) adds to the electrophilic C of the carbonyl group to make a tetrahedral intermediate. The leaving group (L^-) then leaves in the elimination step to give a new carbonyl compound. Note that either L^- or Nu^- may be expelled from the tetrahedral intermediate. Which one that is expelled depends on their relative leaving group abilities and the reaction conditions. Expulsion of Nu^- gives back the starting material (which is not very productive!).

(1) What products are observed from the following reaction (the oxygen of methanol is labeled with the ^{18}O isotope)?

- A
- B
- C
- D
- E
- F

