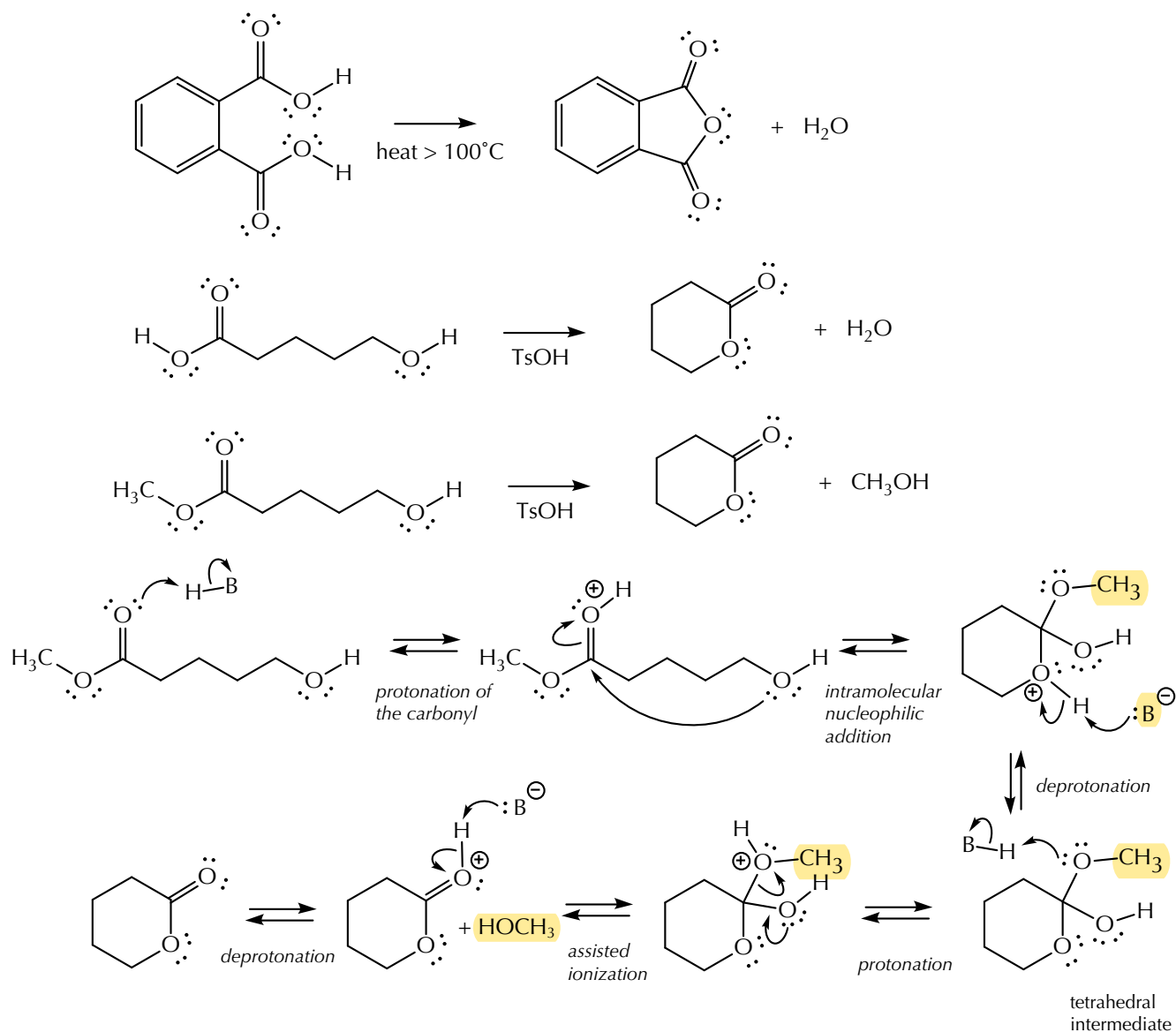


The intramolecular version of acylation reactions is commonly carried out. Factors such as the acid-base properties of the functional groups and the size of the ring being formed can dictate whether acid or base conditions are used. As is typically true, the outcomes and mechanisms for the intramolecular reactions are the same as for their intermolecular counterparts. Intramolecular condensation reactions, in which one molecule reacts to release (typically) water, HCl, or some small molecular weight alcohol, benefit from being driven by the entropic advantage of one molecule becoming two. Figure 1322 illustrates three acid-catalyzed intramolecular acylation reactions.

Figure 1322

## Intramolecular acylation reactions under acid-catalyzed conditions.



In the first case, two carboxylic acid groups combine to give an anhydride plus water (the full mechanism for the intermolecular version of this reaction was shown in Figure 1320C). In the second example, an intramolecular Fischer esterification (see Figure 1320 A) takes place using a carboxylic acid as the acylating agent with an alcohol nucleophile. The functional group for the cyclic ester product is called a lactone. The same lactone can be formed using an intramolecular transesterification reaction, the detailed mechanism for which matches the previously illustrated intermolecular example, in Figure 1320D.