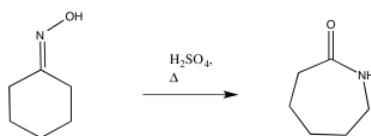
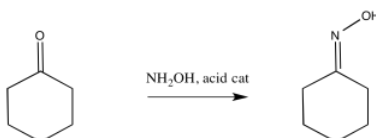


11.4: Beckmann Rearrangement

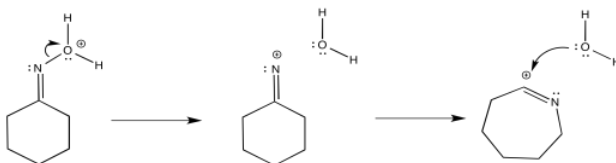
The Beckmann rearrangement results when an oxime (an N-hydroxyimine) is treated with concentrated acid and heated.



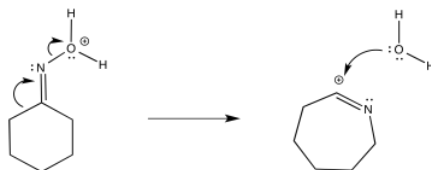
The oxime, in turn, is generated by treatment of a ketone with hydroxylamine. A catalytic amount of acid can activate the carbonyl, accelerating the otherwise sluggish reaction.



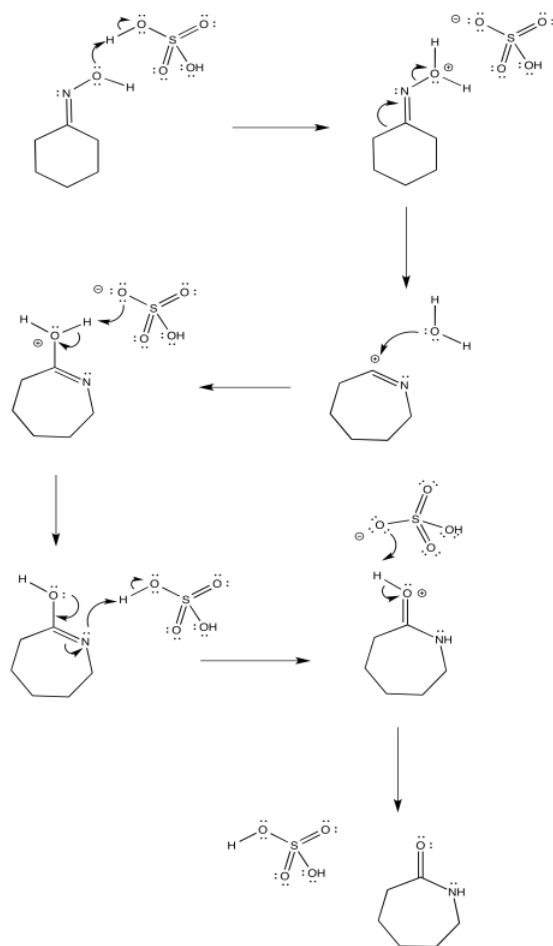
The reaction, like the pinacol rearrangement, is triggered by the loss of water from the starting material. The incipient cation that results undergoes a 1,2-shift. Subsequently, the re-addition of water to the rearranged cation results in a new compound.



By "incipient", we describe a cation that is only on the brink of forming, but has not actually occurred yet. The 1,2-shift happens as soon as the partial positive charge on the nitrogen becomes great enough to draw the electrons from the neighbouring bond.

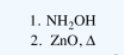
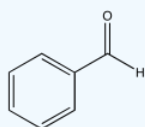
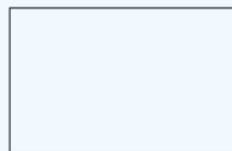
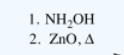
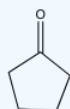
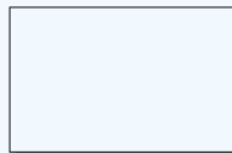
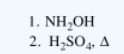
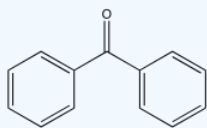
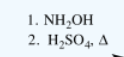
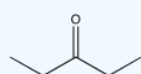


The complete mechanism is described pictorially below.

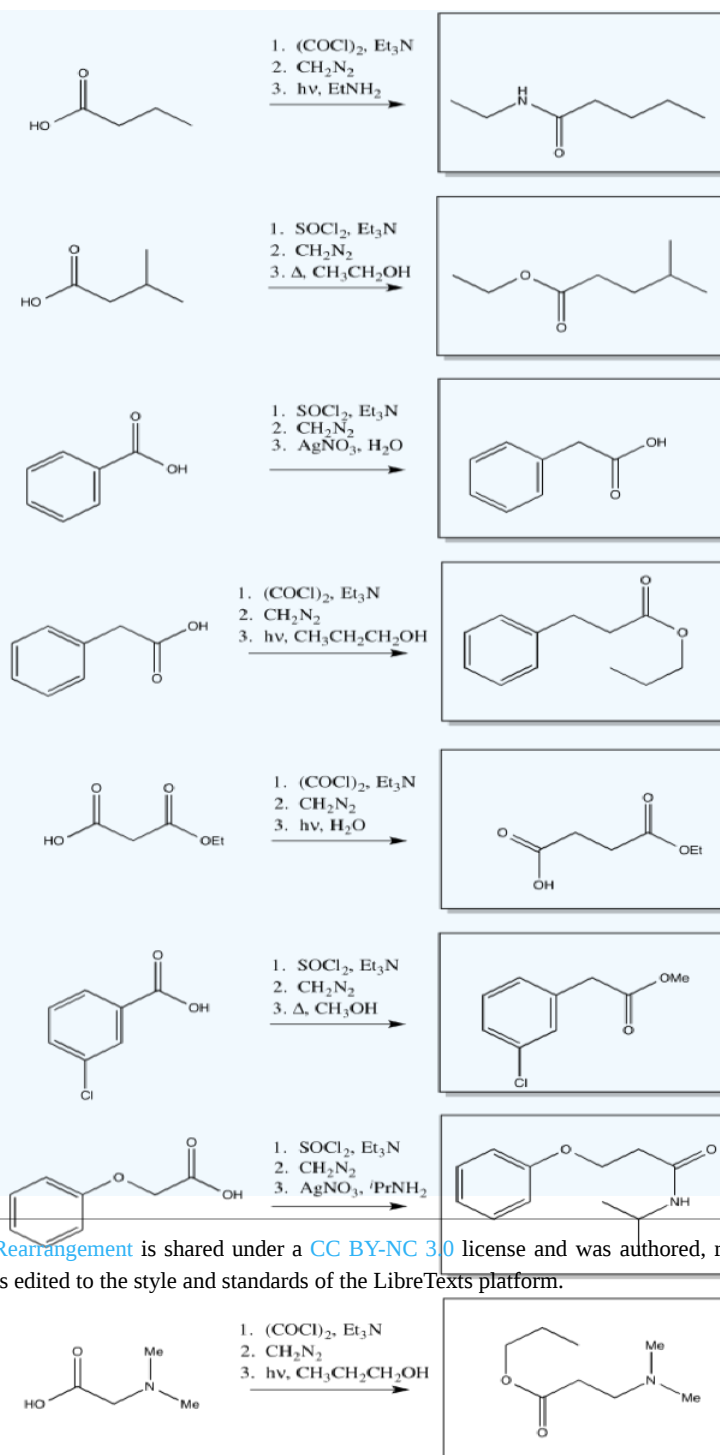


Exercise 11.4.1

Predict the products of the following Beckmann rearrangements.



Answer



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