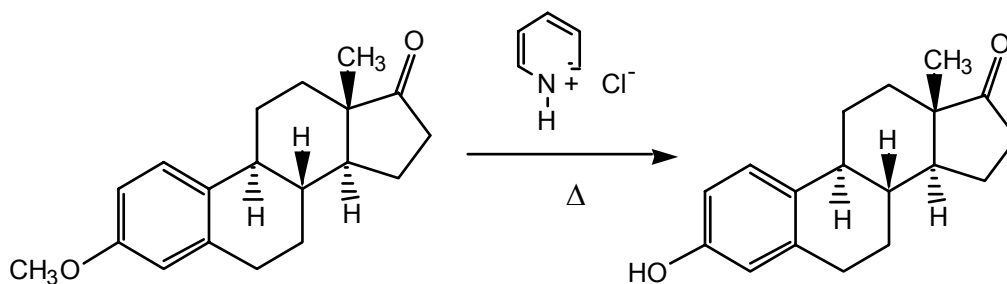


STEP 7:
(±)-ESTRONE



1. Procedure

Place the starting material, estrone methyl ether and pyridine hydrochloride (note 1) (50 equiv) into a 100-mL round-bottomed flask equipped with a stirbar. Seal the flask with a septum, and purge with nitrogen. Connect the reaction flask to a nitrogen balloon, and heat at 210 °C in an oil bath (note 2) for 40 minutes.

Allow the solution to cool to room temperature, then dilute with dichloromethane (50 mL). Wash sequentially with 5% aqueous HCl (2x) and distilled water (2x). Dry the organic layer over sodium sulfate, filter, and evaporate the solvent on the rotary evaporator. Isolate the crude product by flash column chromatography on silica gel (determine appropriate column conditions by TLC), then recrystallize the isolated estrone from methanol.

2. Notes

1. Pyridine hydrochloride, like pyridine itself, can cause serious liver and kidney damage. Pyridine is also associated with central nervous system impairment.

2. **Do not plug an oil bath into the wall socket.** It must be connected to a **Variac** to regulate the voltage. Always inspect the bottom of an oil bath for water droplets. Water in an oil bath may explosively vaporize and spray hot oil when the bath is heated near or above 100 °C.

Use a silicone oil bath, as other oils may break down at this temperature (210 °C). Preheat the oil bath to a stable temperature beforehand. This may take some time, so start heating the oil bath first, then mix the reagents.

3. Characterization and Report

Determine the yield of product both, crude and after each purification step.

List the column conditions used and the R_f values of estrone and any major impurities in the crude reaction mixture.

Characterize the recrystallized estrone by IR, ^1H and ^{13}C NMR, and melting point.

Tabulate and assign the spectral data.

Find a literature reference for the synthesis of racemic estrone. Compare your characterization data with the literature values.