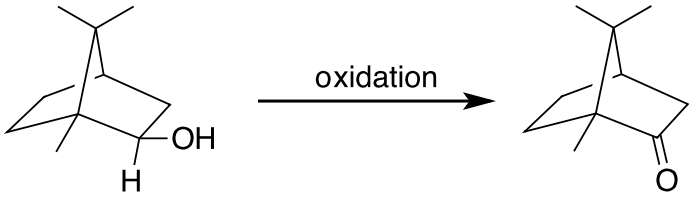
Oxidation of Two Alcohols

TUD Department of Chemistry

The secondary alcohol isoborneol can be easily oxidized to the ketone camphor using household bleach as the oxidizing agent.

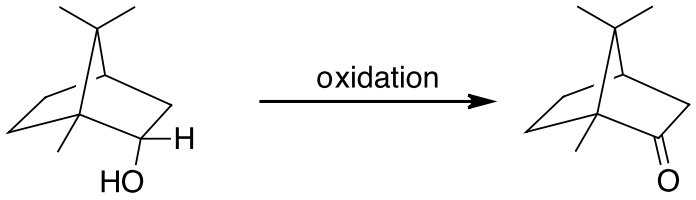


isoborneol camphor

In this first in a series of experiments, we will perform the oxidation as shown and in a subsequent experiment we will reduce the camphor and determine the product of the reduction.

Dissolve 1 g of isoborneol in 5 mL of glacial acetic acid in a 50 mL Erlenmeyer flask. Add 10 mL of Clorox (contains about 5% NaOCl) drop-wise over a period of several minutes. Swirl occasionally and keep the reaction near room temperature by cooling in an ice bath if necessary. Allow the mixture to stand a at room temperature for one hour while continuing to swirl occasionally. The solution should remain faintly yellow. Add aqueous $NaHSO_3$ drop-wise until the yellow color is discharged and pour the solution over ice-cold brine in a 150 mL beaker. Vacuum filter the solid and wash it with saturated aqueous $NaHCO_3$ until the washings are neutral. Continue suction and press the solid dry on the funnel. Transfer the product to a 50 mL Erlenmeyer flask and dissolve in about 20 mL of methyl t-butyl ether (MTBE). Dry the solution with anhydrous $CaCl_2$ and decant the liquid into a suction flask. Rinse the drying agent with a few mL of MTBE and add the rinse to the suction flask. Remove the MTBE under vacuum. Collect the solid, determine the %yield, and characterize by melting point, FTIR, and GC-MS.

Borneol is an alcohol very similar to isoborneol. (What is the sterochemical relationship between borneol and isoborneol? Enantiomers, diasteromers, structural???) Repeat the experiment as described above but using borneol instead of isoborneol. Determine whether the product produced by the oxidation of the two alcohols is the same.



borneol camphor