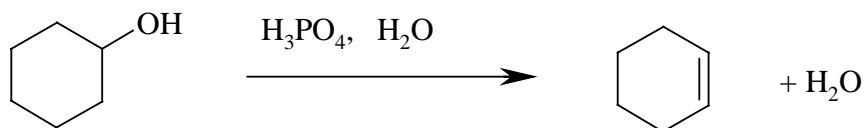


The Synthesis of Cyclohexene

Cyclohexene can be synthesized from cyclohexanol through elimination under acidic conditions. We will test for the presence of the double bond with a bromine test and a permanganate test.

Before lab, review the section of the book on how to prepare your notebook. You will want to know the densities, boiling points and molecular weights of ALL the species involved. Your notebook will be checked.



Experimental:

1. The experiment and subsequent crude distillation will be conducted in a similar apparatus to that used for the distillation of ethanol.
2. Into your short-necked round bottom flask, add the cyclohexanol (1.92 ml), a boiling chip, and 0.5 ml of 85% phosphoric acid. Be prepared to cool the flask in cool water if it gets too hot.
3. Connect the rest of the apparatus and heat gently using the sand bath. Collect the product until you notice very little product being distilled, a definite change in the distillation temperature, or until there is between 0.5 and 1.0 ml left in the round bottom flask.

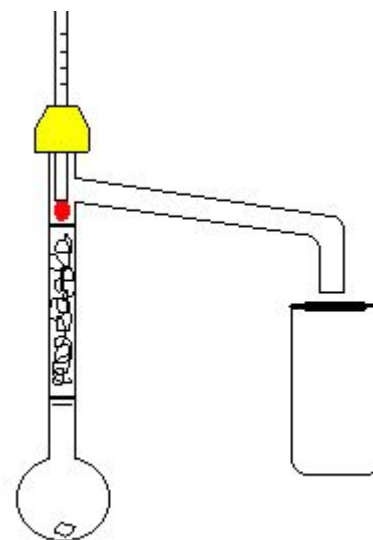
Tests for alkenes

You will need a test tube rack and 6 test tubes.

1. Put about 0.5 ml of a 0.5% Br₂ solution in three test tubes. Put about 5 drops of hexane (petroleum ether) in the first, 5 drops of cyclohexene in the second and 5 drops of your product in the third. Br_{2(aq)} is a brown solution.
2. Put about 0.5 ml of a 1.0% KMnO₄ solution in three test tubes. Put about 5 drops of hexane (petroleum ether) in the first, 5 drops of cyclohexene in the second and 5 drops of your product in the third. MnO₄⁻ is purple, MnO₂ is typically not soluble in water and is black solid.

Post Lab Questions:

1. Please write the mechanism for the elimination reaction (forming cyclohexene). Include all intermediates and show the movement of electrons with curved arrows.
2. Please write the mechanism for the reaction of cyclohexene with Br₂. Include all intermediates and show the movement of electrons with curved arrows.
3. What is the product of the reaction of cyclohexene with MnO₄⁻?
4. Do you think that the product of our distillation is pure? The major impurity is water. How could we remove it?



Please feel free to review <http://www.ucdsb.on.ca/tiss/stretton/chem2/orglab1.htm> for details on the chemical tests.