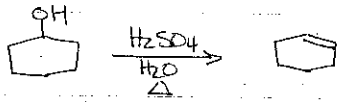
Cal Poly Pomona, L.S. STARKEY NOTEBOOK SAMPLE

Title: Synthesis of Cyclohexene 1/16/17

Purpose: The dehydration of cyclohexanol w/ H_2SO_4 will produce cyclohexene.

Reaction:



Reagent*	MW	Dens.	Amt. (2.1 mL)	Mol	Equiv.*	Remarks*
cyclohexanol	100.16	0.96	2.0 g	0.020	1.0	bp 161°C
H_2SO_4 (conc.)	98.07	18.4 M	0.4 mL	0.007	0.37	caution! corrosive
water	18.0	1.0	0.3 mL	-	-	-
cyclohexene	82.14	0.81	1.64 g*	0.020	1.0	bp 83°C, flammable!

Workup materials: toluene, aq. NaCl soln, $CaCl_2$

Calculations*

$$2.0\text{ g cyclohexanol}_{\text{used}} \times \frac{\text{mol}}{100.16\text{ g}} = 0.020\text{ mol}$$

Theor. yd.: $0.020\text{ mol cyclohexene}_{\text{expected}} \times \frac{82.14\text{ g}}{1\text{ mol}} = 1.64\text{ g}$

Product is final entry in table

Sketch of Apparatus*

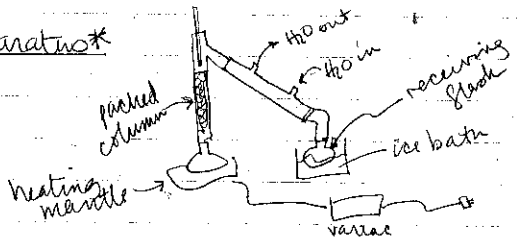


FIG 1 Fractional Distillation Apparatus

Workup Outline

Step	Purpose
A. Wash with aq. NaCl	remove H_2O (dry)
B. Add $CaCl_2$	remove trace H_2O (dry)
⋮	
F. Rotovap	remove ether

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Procedure*:

1) To a 5 mL R.B. flask, add the H_2O, then the H_2SO_4 and then the cyclohexanol + boiling chip.
2) Cover (?) + shake to mix layers. (heat?)
3) Assemble apparatus in Fig 1.
⋮
10) etc

Workup:

11) Transfer distillate to a test tube
12) Wash w/ equal vol. of satd NaCl soln.
13) Remove aq. layer (bottom)
14) Dry org. layer (top) w/ ~~$CaCl_2$~~ Na_2SO_4 (product is here!)

Waste Disposal: Aqueous solns flush down drain...

Observations
→ alcohol is clear, colorless liq.
→ Turned bright pink.
→ flask got hot
→ distilled @ 80°C
⋮
etc.
→ spilled some here
→ used Na_2SO_4 as the drying agent
→ obtained 0.02 g product as a clear, colorless liquid

*to be written in ink during lab!

Prelab Assignment

*Notes: Prelab is worth 50% of total lab grade! If it is not done before lab, 25 pts are deducted.

Reagents list all species used in rxn (include solvents) but not workup materials

Equiv. is molar ratio or # of equivalents used.

Remarks should include mp (solids), bp (liquids), solubility, + any relevant hazards/precautions

1.64 g This is the theoretical yield of product, as calculated.

Calculations should include proper units

Sketch new apparati only. If used before, reference that sketch's page # here. (ie, see Sep. Funnel sketch on p15)

Procedure Brief, step-by-step outline. Indicate where the reaction workup (product isolation) begins. Finish with notes on waste disposal. Modify as needed while conducting experiment!

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