

Name _____

Partner Name _____

TA Name _____

Section Day _____ Time _____

Experiment 6 – Synthesis of *t*-Pentyl Chloride

Use as reference for notebook preparation – every student submits on Canvas individually after lab

Pre-Lab Requirements

1. **Dress for lab** – see safety rules – arrive a few minutes early
2. **Lab Notebook**: copy templates below into designated notebook
 - **Purpose, scheme, and reagent table**
 - **Procedure Diagrams** – must be complete before you can start the lab

A. Purpose and substitution reaction:**B. Reagent Table**

Name	Volume	Density	Mass	milli moles	Molecular Mass	Boiling or melting point	Hazards
<i>t</i> -pentanol (<i>t</i> -pentyl alcohol)							
HCl, 37% w/w		1.2 g/mL					
<i>t</i> -pentyl chloride (product)	-						

C. Procedure Diagrams – hand-drawn using procedure in lab PDF, class notes, & Slugs@home

- Instructions, sketches, & labels for **all equipment, chemical names with amounts, & transfers**
 - Leave space to record additional **notes and observations** within the procedure diagrams
1. **Reaction set-up** – adding chemicals to conical vial, mix, & sit
 2. **Reaction work-up** – refer to extraction diagram in lecture notes
 3. **Silver Nitrate or Sodium Iodide Test** – contents of each test tube & observations
 4. **GC Analysis** – labeled sketches of each chromatogram
 5. **Analysis of IR spectrum** – labeled sketches of IR spectra with main peaks labeled

D. Accountability-Buddy Contract: Students work together to submit one report and get the same grade in GradeScope. Add your name to one box in part **(a)** and schedule a time to collaborate after lab in part **(b)**.

(a) Who's finalizing what? Discuss the in-lab questions in the lab PDF with your partner during / after lab. Decide who will type the final abstract and type or draw the revised responses to which in-lab questions.

Name	Report Component Abstract / In-Lab #

(b) "DO" Date: _____ = when / how you'll meet or exchange work to discuss & proofread, at least 1-2 days before the DUE date to give each other time to review & revise responses.

Who will combine both sets of in-lab questions and submit as one PDF to GradeScope? _____

E. Experiment 6 Data

Volume of *t*-pentyl alcohol _____

Theoretical yield _____

- What gas is released during the reaction workup? _____
- Is the product in the top or bottom layer? _____
- Notes on potential Product Loss:

Mass of product _____

% yield =

Chemical Tests: Silver Nitrate in Ethanol or Sodium Iodide in Acetone (circle one)

Sample	Observations	Interpretation
1. <i>t</i> -Pentanol		
2. Product mixture		
3. Bromobenzene		
4. Butyl bromide		

Draw the two chemical reactions that occurred in all positive chemical tests reported above: starting material, reagent & solvent (either sodium iodide in acetone or silver nitrate in ethanol), and product. *Revisit your Exp 6 pre-lab quiz for related questions* ☺

IR Spectrum - Starting material - *t*-pentyl alcohol, draw structure

Functional Group	Bond Assignment (C=O, N-H, etc.) from IR Table	Expected Wavenumber Range (cm ⁻¹)	Observed Wavenumber (cm ⁻¹)

IR Spectrum - Product mixture, draw product structure

Functional Group	Bond Assignment (C=O, N-H, etc.) from IR Table	Expected Wavenumber Range (cm ⁻¹)	Observed Wavenumber (cm ⁻¹)

- Is water potentially present in the product mixture? _____

GC Standards Chart speed: 2.5 cm/min

Peak ID	Corrected Retention Time, t_R' (sec)
<i>t</i> -Pentyl Alcohol	
<i>t</i> -Pentyl Chloride	

Product Mixture GC Results

Peak ID	Corrected Retention Time, t_R' (sec)	Integration (cm ²)	Percent Composition (%)

- Is starting material present in the product mixture? _____

Retention Time Calculations, t_R'

Integration / Area Calculations:

Calculation of Percent Composition: