

Lab Report: Synthesis and Identification of Polymers

NAME: _____

PARTNER'S NAME: _____

LAB SECTION: _____

DATE: _____

% SCORE:

	Points possible	Points received
Lab Notebook		
Mechanisms		
Polymer ID		
Questions		

A. MECHANISMS

Write the reaction mechanism for the formation of polystyrene. Include and label initiation steps, propagation steps showing polymer growth and a termination step (show a termination that does not include the initiating compounds).

B. POLYMER IDENTIFICATION

1. Station A.

Match the polymer structures with their IR spectra. Place your answers below. Include a brief description of how you assigned the polymer by listing specific frequencies and bond stretches.

Table A Polymer Identification by IR		
Letter	Polymer	Description
	Polyethylene LDPE	
	Polystyrene PS	
	Polyvinyl Acetate	
	Nylon 6.10	
	Polyvinyl Alcohol PVA	
	Poly(1,4-butylene terephthalate) <i>like PETE</i>	

2. Station B

Station B has 3 samples of materials that you will study by IR. Obtain the IR spectrum (you do not need to print it out). Identify the polymer from Table A that makes up each material, again stating frequencies and related bonds that you used to identify the polymer.

Table B. Polymers and IR Spectra		
	Determined Polymer	How Determined?
Bread Wrapper		
Hospital laundry bag		
Envelope Window		

3. Station C

Match the letter on the vials to the object. **Hint: use density, color, and clarity to determine the identity of each.**

Table C. Polymer Density		
	Vial?	How Determined?
Lens Blank		
Yogurt container		
Juice bottle		

C. QUESTIONS

1. Which polymer would be least likely to degrade on contact with aqueous acid or base? Why?

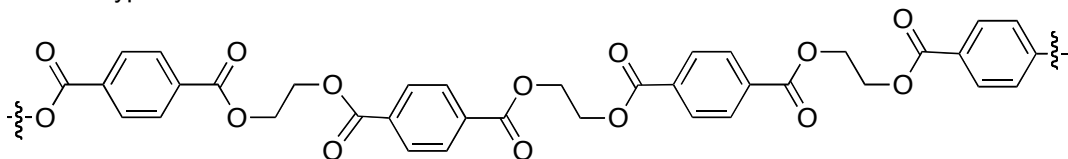
LDPE

PETE

PVALCHOL

NYLON

2. Why was the sebacoyl chloride instead of the sebacic acid used to synthesize nylon (6,10)?
3. The hospital laundry bag dissolves in water. Explain based on the polymer structure, why the particular polymer you determined is used in these bags. Using structures and words, describe what happens at a molecular level as the polymer dissolves.
4. A fragment of a polymer is shown below. Draw the structures of the 2 monomers that would undergo condensation polymerization to produce this polymer and identify the small molecule byproduct of condensation.



5. Why was 1mL of 3 M NaOH added to the aqueous solution of hexane-1,6-diamine in the synthesis of nylon (6,10)?