

Code:	Name:
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Experiment 1

The Synthesis of D,L-Phenylglycine and Its Optical Resolution

Total Scores: 100 points

	1-1	1-2	1-3	1-4	1-5	Σ
Total Points	25	15	25	5	30	100
Received						

Step 1. Preparation of (D,L)-phenylglycine

<p>1-1</p> <p>Weight of benzoylformic acid used: _____g</p> <p>Weight of fritted glass funnel: _____g</p> <p>After complete dryness:</p> <p>Product weight + fritted glass funnel: _____g</p> <p>[Weigh on a balance that reads to the nearest centigram (0.01g)].</p> <p>Weight of D,L-phenylglycine obtained: _____g</p> <p>Chemical yield: _____%</p> <p>Calculate the chemical yield (% yield; show the calculations).</p> <p>Recommended scoring standard:</p> <div style="text-align: center;"> </div>
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We will double check the calculations, 5 points will be taken off for the wrong calculations. Points will be given based on the correct chemical yield.

1-2

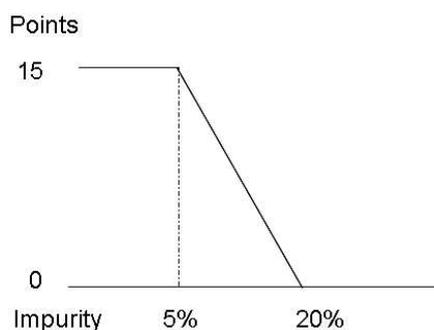
Turn in the sample (in the vial with blue label).

Signature of student: _____

Signature of the lab assistant:

[The organization committee will weigh an appropriate amount of sample (0.01g) for ¹H NMR spectroscopic analysis.]

Recommended scoring standard:



Impurity may come from the ammonium formate and unknown side products. From our pilot studies, most students will be able to get 15 points.

Step 2. Optical resolution of D,L-phenylglycine by (+)-camphorsulfonic acid [(+)-CSA]

1-3

Confirmed and signed
by lab assistant

Weight of D,L-phenylglycine used: _____g

_____g /

Weight of fritted glass funnel: _____g

_____g /

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After complete dryness:

Product weight + fritted glass funnel: _____g

_____g /

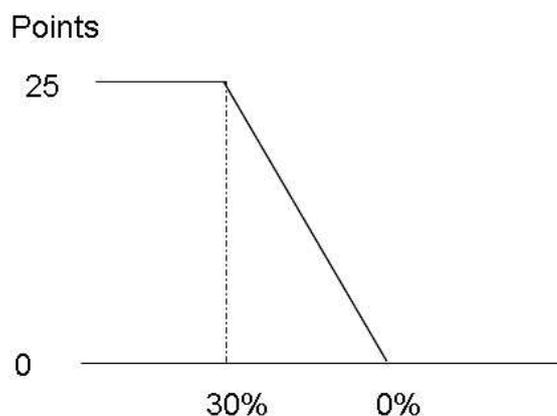
[Weigh on a balance that reads to the nearest centigram (0.01g)].

Weight of the resolved phenylglycine • (+)-CSA salt: _____g

Chemical yield: _____%

Calculate the chemical yield (% yield; show the calculations).

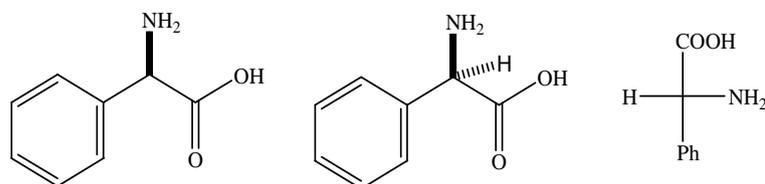
Recommended scoring standard:



We will double check the calculations, 5 points will be taken off for the wrong calculations. Points will be given based on the correct chemical yield.

1-4

Draw the correct configuration formula (stereochemical structure) of the isolated phenylglycine.



If only correct chemical structure is given (no stereo chemistry), 1 point is given.

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1-5

Specific rotation of the enantiomeric phenylglycine • (+) CSA salt (to be determined by the organization committee)

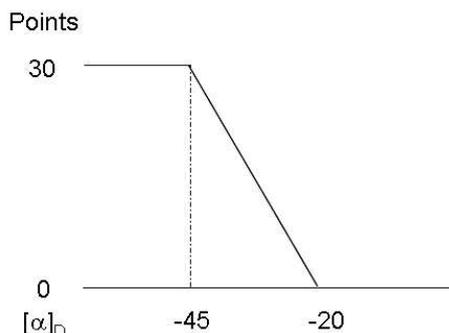
Turn in the sample (in the vial with pink label).

Signature of student: _____

Signature of the lab assistant:

[The organization committee will weigh an appropriate amount of sample (0.055 ~ 0.065g) for measurement of optical purity.]

Recommended scoring standard:



The organization committee will weigh the resolved product (from the fritted glass funnel) for students who fail to finish the procedure in time. However, 15 penalty points will be taken.

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Experiment 2

Identification of Unknown Inorganic Samples

Total Scores: 100 points

	2-1	2-2	Σ
Total Points	96	4	100
Received			

2-1

<u>Unknown Compound</u>	<u>Code Number**</u>	<u>Unknown Compound</u>	<u>Code Number**</u>	<u>Unknown Compound</u>	<u>Code Number**</u>
HCl	____, ____	H ₂ SO ₄	____, ____	NH ₄ SCN	____, ____
NaOH	____, ____	BaCl ₂	____, ____	K ₄ Fe(CN) ₆	____, ____
Na ₂ CO ₃	____, ____	ZnCl ₂	____, ____		
Na ₂ SO ₃	____, ____	H ₂ O ₂	____, ____		

**Second column is for duplicates.

2-2

A. Write the electrolysis equation that would help you confirm that an unknown sample is ZnCl₂.



B. Write one equation that shows how to clean the deposit of Zn on the electrode (limited to the items provided in this task).

