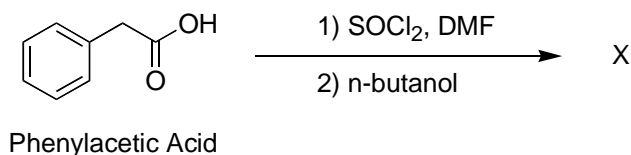


Experimental Chemistry I
CH 362/362H
PreLab 3
Winter Term, 2009

Your Name: _____

Pre-Lab assignments are due at 1pm before lecture – Jan 27 TR Section; Jan 28 WF Section. Show all work and use proper significant figures.

1. (4 pts)



As is shown in the scheme above, a chemist used 13.6 g of phenylacetic acid, 8.1 mL of thionyl chloride, and 11.9 mL of n-butanol to synthesize compound X.

phenylacetic acid (MW= 136.15 g/mol)

thionyl chloride (MW = 118.97 g/mol, density = 1.638 g/mL)

n-butanol (MW = 74.12 g/mol, density = 0.8098 g/mL)

a. What is the limiting reagent?

b. What is the structure of X?

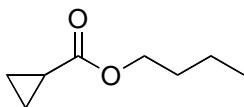
c. What is the theoretical yield (in grams) of X? (MW of X: 192.25 g/mol)

2. (3 pts)

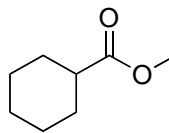
The refractive index (RI) of benzyl acetate is $n_D^{20} = 1.503$. The RI of benzyl alcohol is $n_D^{20} = 1.590$. The measured RI at 20°C of the synthesized sample of benzyl acetate was 1.510. What is the percentage of the benzyl acetate in the sample assuming it is a mixture of the ester and the alcohol? Show your work and use proper significant figures.

Hint: $n_{\text{sample}} = n_A x + n_B(1-x)$ where x = the mole fraction of A

2. (3 pts)



Butylcyclopropanecarboxylate



Methylcyclohexanecarboxylate

Identify three regions in the IR spectra for the above compounds where one expects to see major peaks and indicate the functional group in the molecule that region corresponds to. (Each region can be specified as a range of cm^{-1} values.)

	Butylcyclopropanecarboxylate			Methylcyclohexanecarboxylate		
	Peaks (cm^{-1})	Functional groups		Peaks (cm^{-1})	Functional groups	
1				1		
2				2		
3				3		