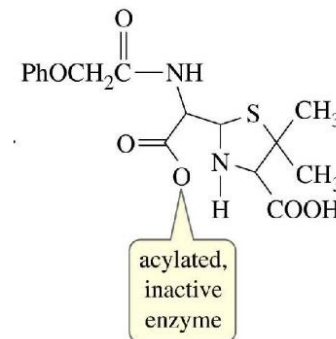


# Introduction

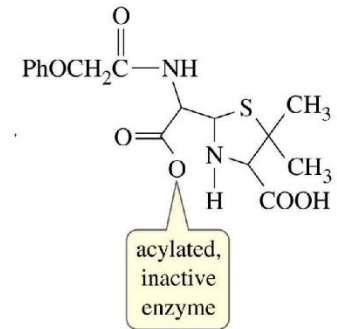


- Represent as:

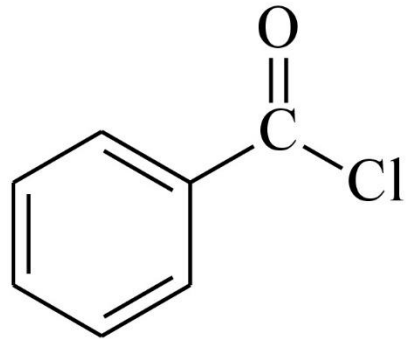


- More reactive than acids; halogen, Cl withdraws  $e^-$  density from carbonyl makes C carbonyl a very good electrophile.

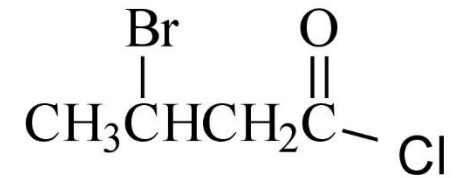
# Nomenclature



- Named by replacing *-ic acid* with *-yl chloride*.

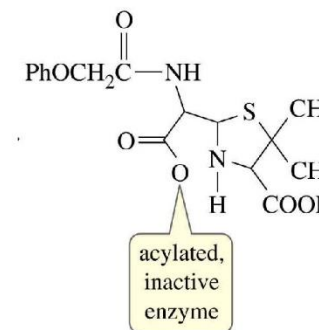


*Benzoyl chloride*



*3-bromobutanoyl chloride*

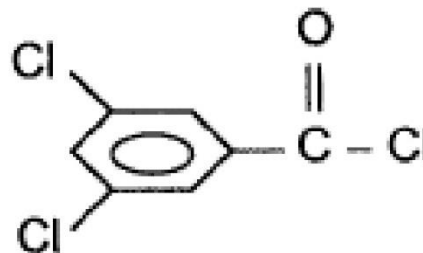
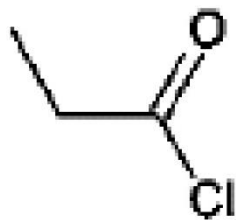
# Nomenclature



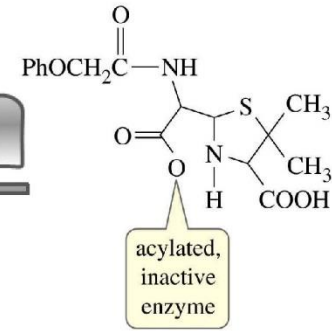
Draw the structural formulae for each of the following compounds:

- 3 - chloro - 4 - nitrobenzoyl chloride
- 4 - ethylbenzoyl chloride
- 4 - methylbenzoyl chloride

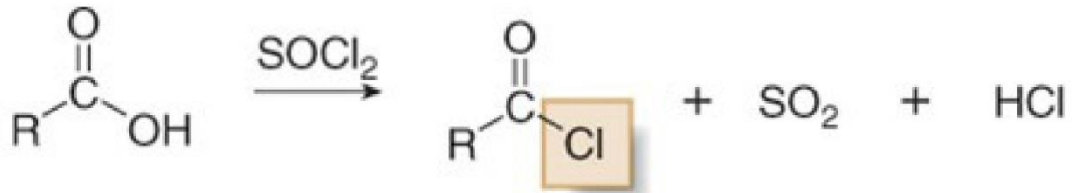
Write the IUPAC names for the following compounds:



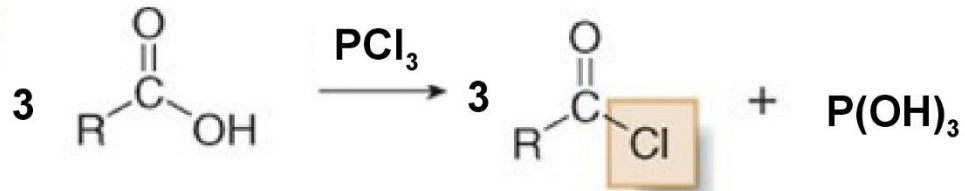
# Preparation from Carboxylic Acid



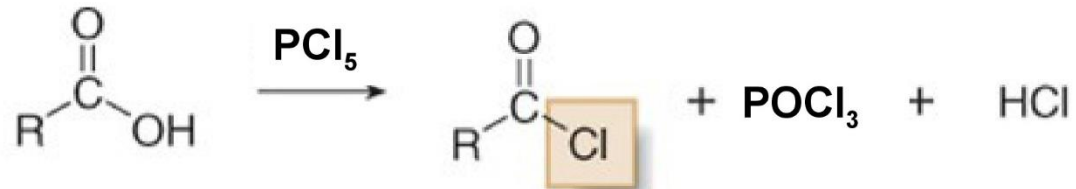
General reaction



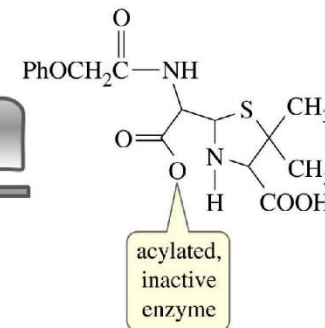
General reaction



General reaction



# Preparation from Carboxylic Acid

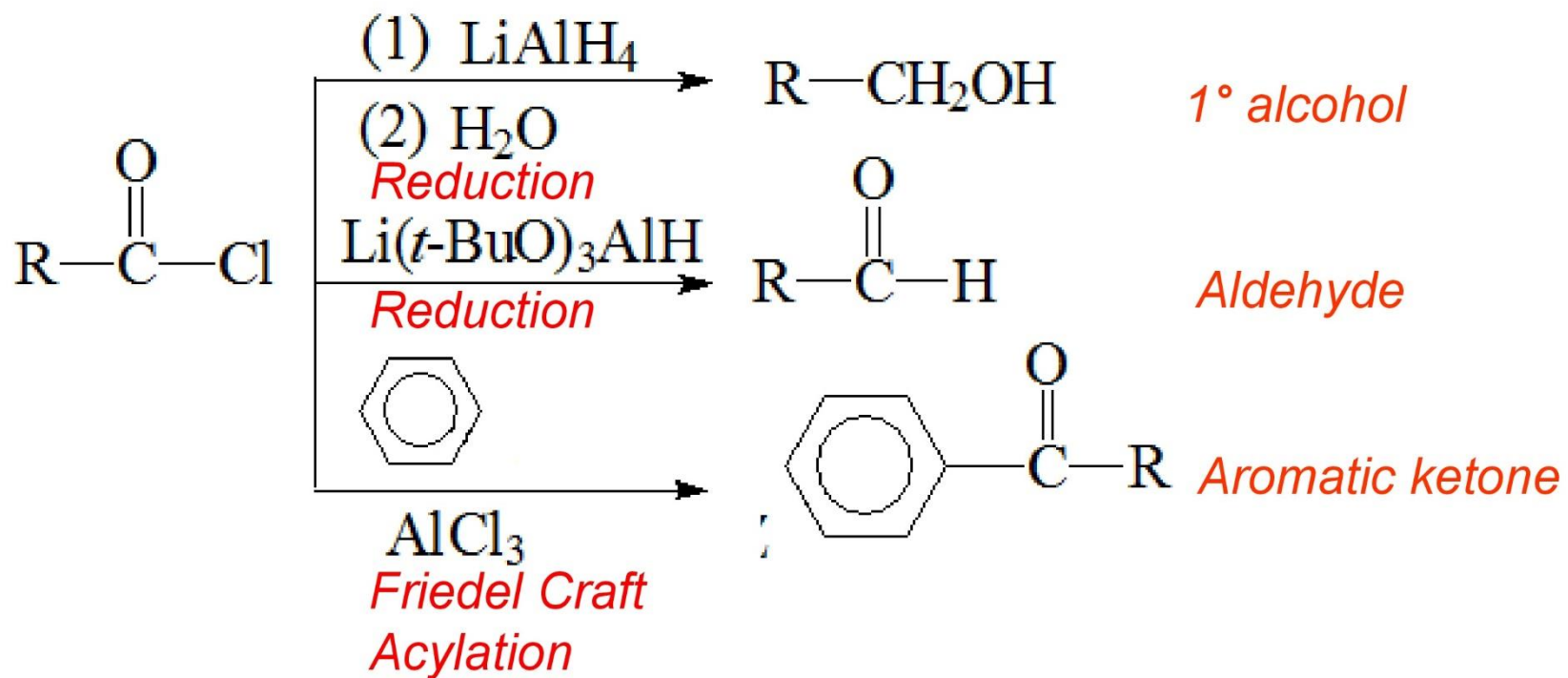
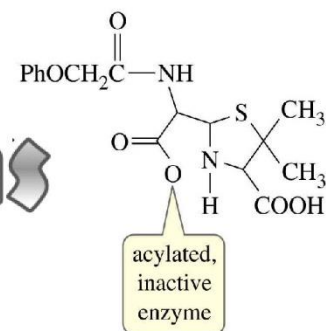


Show how the following compounds can be prepared

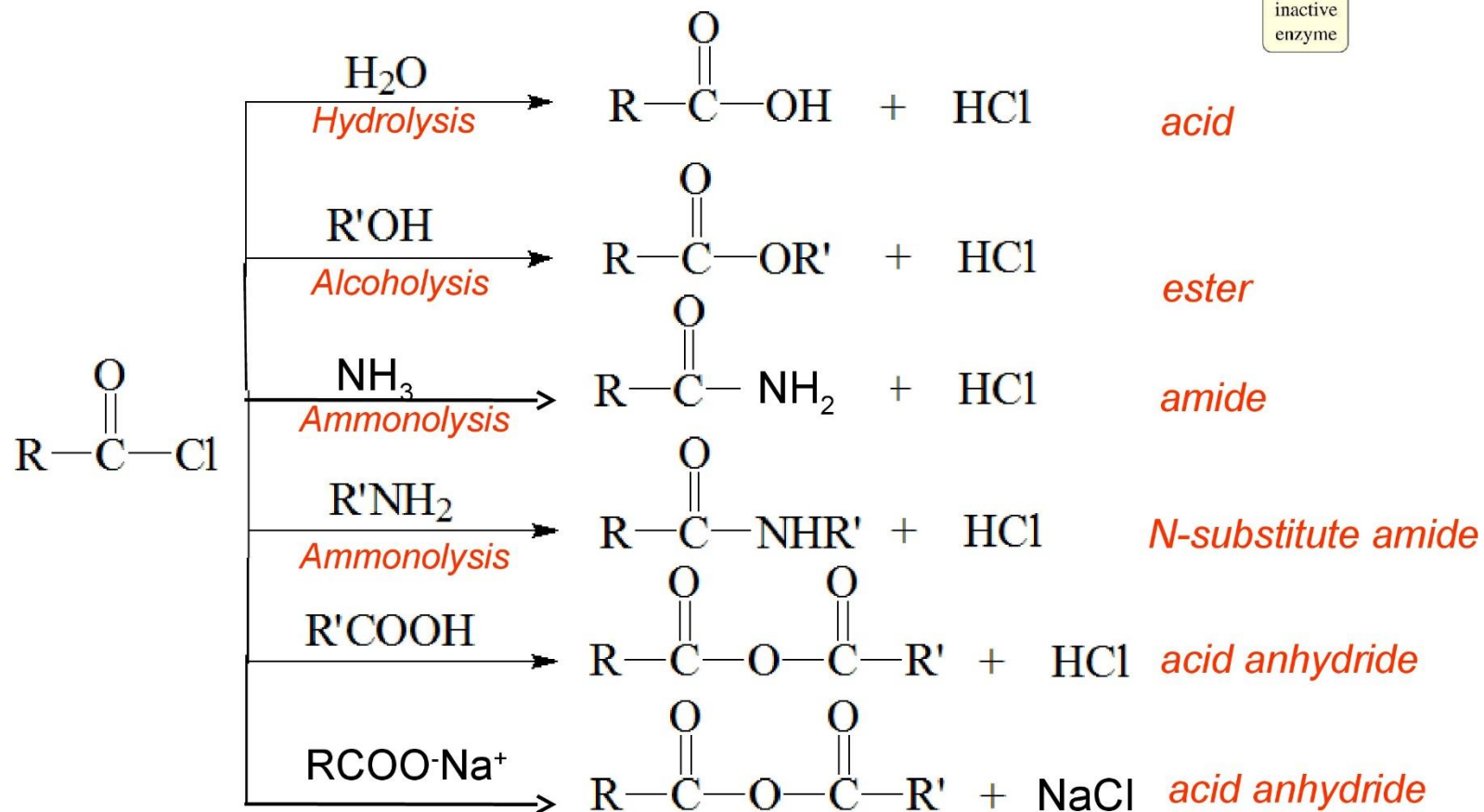
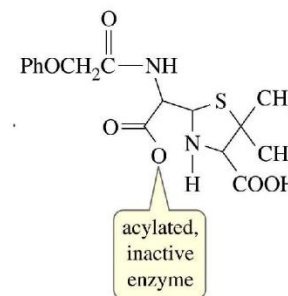
a)  $\text{C}_6\text{H}_5\text{COCl}$  from  $\text{C}_6\text{H}_5\text{COOH}$

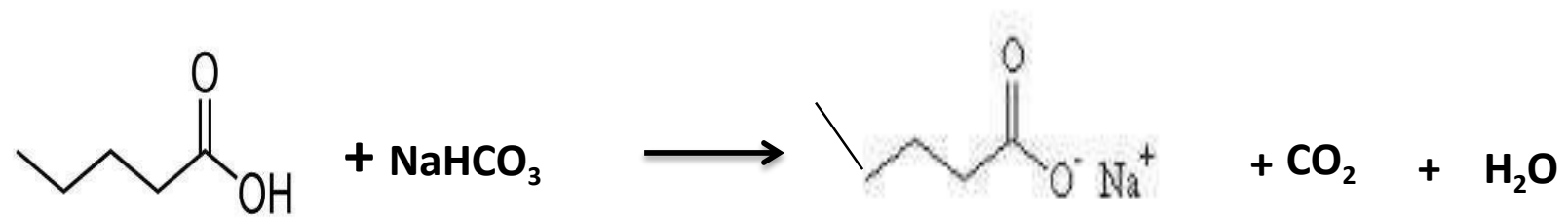
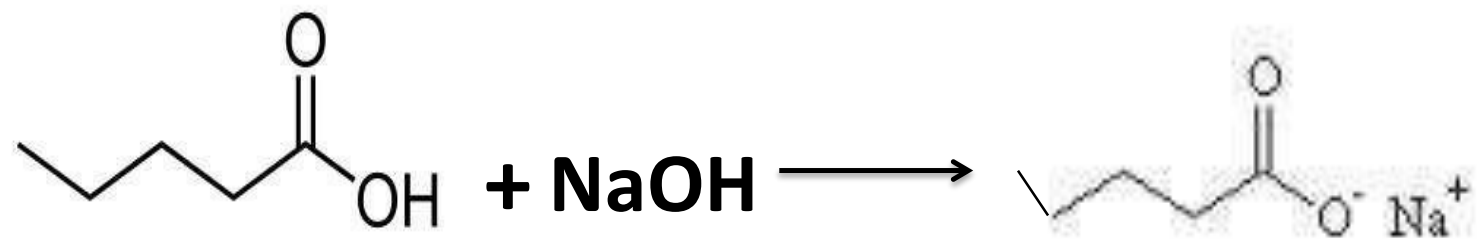
b)  $\text{CH}_3\text{COCl}$  from  $\text{CH}_3\text{CN}$

# Acid Chloride Reactions



# Nucleophilic Acyl Substitution Reaction







## Solubility

Carboxylic acids are polar. Because they are both hydrogen-bond acceptors (the carbonyl) and hydrogen-bond donors (the hydroxyl), they also participate in hydrogen bonding.

Smaller carboxylic acids (1 to 5 carbons) are soluble with water, whereas higher carboxylic acids are less soluble due to the increasing hydrophobic nature of the alkyl chain.

## Carboxylic acid



# Carboxylic acid

## Nomenclature

IUPAC:

- Alkane + "-oic acid"

\*butane > butanoic acid

\*propane > propanoic acid

## **A. ACIDITY AND STRUCTURE**

	<u>PH</u>
<b>Acetic acid</b>	<b>3.0</b>
<b>Monochloroacetic acid</b>	<b>2.0</b>
<b>Trichloroacetic acid</b>	<b>1.0</b>

## **DISCUSSION:**

**Trichloroacetic** acid is more acidic because of the presence of the 3 chlorine atoms which tend to pull the electrons closer leaving the Hydrogen more prone to leave.

# References

- ***Organic Chemistry 11e***, T.W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder, John Wiley & Sons, Inc., 2014, ISBN 978-1-118-13357-6 (cloth) Binder-ready version ISBN 978-1-118-14739-9
- ***Organic Chemistry: A Short Course, 13<sup>th</sup> Ed.***, D.J. Hart, C.M. Hadad, L.E. Craine, H. Hart, Brooks/Cole, Cengage Learning, 2012, ISBN-13: 978-1-111-42556-2
- ***Organic Chemistry, 6<sup>th</sup> Ed.***, L. G. Wade, Pearson Education, Inc., 2006, ISBN 0-13-147871-0
- ***Organic Chemistry, 2<sup>nd</sup> Ed.***, Jonathan Clayden, Nick Greeves, and Stuart Warren,, Oxford University Press, 2012, ISBN: 9780199270293
- ***Organic Chemistry***, Mukherjee, S.M., et al., New Age International Ltd, 2008. ProQuest Ebook Central, <http://ebookcentral.proquest.com/lib/ankara/detail.action?docID=3017383>.



- Thank you very much for listening to me.

**Prof.Dr. Canan KUŞ**

**Pharmaceutical Chemistry Department**

