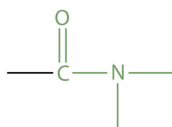


12.13: Amides- Structures and Names

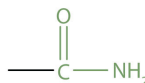
Learning Objectives

- Identify the general structure for an amide.
- Identify the functional group for an amide.
- Recognize amides from molecular structures and names.

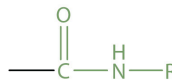
The amide functional group has an nitrogen atom attached to a carbonyl carbon atom. If the two remaining bonds on the nitrogen atom are attached to hydrogen atoms, the compound is a *simple amide*. If one or both of the two remaining bonds on the atom are attached to alkyl or aryl groups, the compound is a *substituted amide*.



The amide group



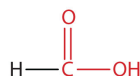
A simple amide



A substituted amide

The carbonyl carbon-to-nitrogen bond is called an *amide linkage*. This bond is quite stable and is found in the repeating units of protein molecules, where it is called a *peptide linkage*.

Simple amides are named as derivatives of carboxylic acids. The *-ic* ending of the common name or the *-oic* ending of the International Union of Pure and Applied Chemistry (IUPAC) name of the carboxylic acid is replaced with the suffix *-amide*.



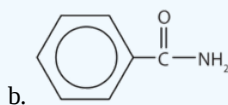
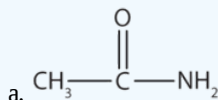
Formic acid
(methanoic acid)



Formamide
(methanamide)

✓ Example 12.13.1

Name each compound with the common name, the IUPAC name, or both.

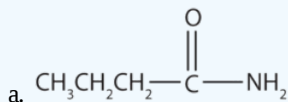


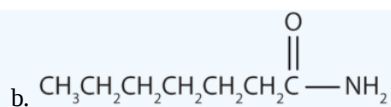
Solution

- This amide has two carbon atoms and is thus derived from acetic acid. The OH of acetic acid is replaced by an NH₂ group. The *-ic* from *acetic* (or *-oic* from ethanoic) is dropped, and *-amide* is added to give *acetamide* (or ethanamide in the IUPAC system).
- This amide is derived from benzoic acid. The *-oic* is dropped, and *-amide* is added to give *benzamide*.

? Exercise 12.13.1

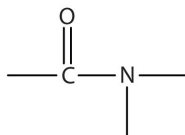
Name each compound with the common name, the IUPAC name, or both.





Key Takeaways

- Amides have a general structure in which a nitrogen atom is bonded to a carbonyl carbon atom.
- The functional group for an amide is as follows:



- In names for amides, the *-ic acid* of the common name or the *-oic* ending of the IUPAC for the corresponding carboxylic acid is replaced by *-amide*.

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