

12.9: Ethers

Race car drivers are always looking for that "edge" that will make their car (legally) faster than their competitors' cars. One way to get more speed is to burn the gasoline in the car engine more efficiently. Methyl t-butyl ether (MTBE) has been used for this purpose, but is being discontinued due to concerns about the contamination of drinking water by leaking fuel tanks that contain this compound.

Ethers

An **ether** is an organic compound in which two alkyl groups are bonded to the same atom of oxygen. An ether is represented by the general formula $\text{R}-\text{O}-\text{R}$. The R groups may be the same or they may be different. Ethers often go by their common name rather than their IUPAC name. Here are the basic guidelines:

Nomenclature of Ethers

Ethers are named using the following convention:

1. Name each **alkyl group** attached to the oxygen in alphabetical order, followed by the word *ether* (Example: butyl ethyl ether).
2. If the two attached alkyl groups are identical, use the prefix *di-* for the alkyl group (Example: dimethyl ether).

Example 12.9.1

A. Assign a name to the molecule below:



B. Write the condensed structural formula of diethyl ether.

Solution

- A. The alkyl group to the left of the oxygen has one C atom, which makes it a *methyl* group. The alkyl group to the right of the oxygen has two C atoms, which makes it an *ethyl* group. Alphabetically, *ethyl* comes before *methyl*, giving it a name of *ethyl methyl ether*.
- B. The name *diethyl ether* means there are two *ethyl* groups attached to the O atom. An ethyl group has two C atoms. Since an O atom only makes two bonds, the condensed structural formula is:



Exercise 12.9.1

A. Assign a name to the molecule below:



B. Write the condensed structural formula of butyl methyl ether.

Answer A

dimethyl ether

Answer B**Summary**

- An ether is an organic compound in which two hydrocarbon groups are bonded to the same atom of oxygen.
- Common naming rules for ethers are given.

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