



HELLENIC REPUBLIC

UNIVERSITY OF CRETE

Academic English

Section: Alkanes text and listening task

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Naming Alkanes Video

Listen to the lecture, take notes and complete the missing information:

Alkanes are saturated where all the carbons arebonded to each other.

Structurally, C_4H_{10} carbons can be attached in aor a branched chain but they're structurally very different. They actually have very different chemical, and they're used in very different ways.

A parent chain or theof the carbon chain is the.....
The side shoot offs (side branches within the carbon chains) are called groups.

We use the prefix meth for one carbon. If you have one carbon side chain that's agroup. If we have two carbons, we have a/an..... group.

There's a/angroup which is attached which is four carbons attached to the parent chain and that can be also rearranged.

The first step is to count the number of carbons in thecarbon chain.

The second step is to number each carbon giving all the substituents the lowest numbers.

Then we name the carbons as one, two, three, four, five, six, seven etc. Then we name the substituents. Well, we have three of them. If we have more than one of the same substituents we use prefixes. So the prefix for three is

We useto separate the numbers andto separate the numbers.

We also use the suffix -ane to represent or singly bonded carbons.

Glossary:

isopropyl group

the univalent group C_3H_7 , an isomer of the propyl group.

Organic Chemistry: Alkanes

How many functional groups are you aware of?

What determines the nomenclature of alkanes?

What is conformation?

How are staggered and eclipsed conformations different?

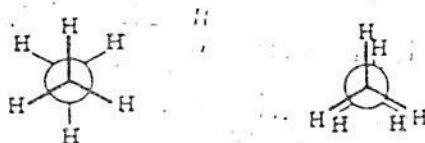
Which are the rules for a skeletal structure?

How are axial bonds different from equatorial bonds?

A functional group is an atom or group of atoms within a larger molecule that has a characteristic chemical reactivity. Because functional groups behave approximately the same way in all molecules where they occur, the chemical reactions of an organic molecule are largely determined by its functional groups.

Alkanes are a class of hydrocarbons having the general formula C_nH_{2n+2} . They contain no functional groups, are chemically rather inert, and can be either straight-chain or branched. Alkanes can be named by a series of IUPAC rules of nomenclature. Isomerism is possible for all but the simplest alkanes. Compounds that have the same chemical formula but different structures are called **isomers**. Compounds such as butane and isobutane, which have the same formula but differ in the way their atoms are connected, are called **constitutional isomers**.

As a result of their symmetry, rotation is possible about carbon-carbon single bonds. Alkanes can therefore adopt any of a large number of rapidly interconverting conformations. Newman projections allow us to visualize the spatial consequences of bond rotation by sighting directly along a carbon-carbon bond axis. Staggered conformations are more stable than eclipsed conformations.



Staggered conformation

Eclipsed conformation

Cycloalkanes contain rings of carbon atoms and have the general formula C_nH_{2n} . Because conformational mobility (rotation) is reduced in cycloalkanes, complete rotation around carbon-carbon bonds is not possible. Disubstituted cycloalkanes can therefore exist as **cis-trans stereoisomers**. In the **cis** isomer, both substituents are on the same side of the ring, whereas in the **trans** isomer, the substituents are on opposite sides of the ring. Cyclohexanes are the most important of all rings because of their wide occurrence in nature. Cyclohexane exists in a puckered, strain-free chair conformation in which all bond angles are near 109°



and all neighboring C-H bonds are staggered. Chair cyclohexane has two kinds of bonds, axial and equatorial. Axial bonds are directed up and down, parallel to the ring axis; equatorial bonds lie in a belt around the ring equator. Chair cyclohexanes can undergo a ring-flip that interconverts axial and equatorial positions. Substituents on the ring are more stable in the equatorial than in the axial position.

Notes

Reference Note

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