

Answer on Question #43827 - Chemistry - Organic Chemistry

Question:

How are cyclopentane and 1-pentene different and discuss why they are different.

Answer:

Cyclopentane and 1-pentene are structural isomers of the same molecular formula C_5H_{10} and the same molar mass, but they are different in physical properties, namely

1) density (0.751 g/mL for cyclopentane and 0.640 g/mL for 1-pentene)

2) melting point (-93.9°C for cyclopentane and -165.2°C for 1-pentene)

3) boiling point (49.2°C for cyclopentane and 30.0°C for 1-pentene) etc.

and in

4) chemical reactivity: cyclopentane is stable and chemically inert, only participating in radical-chain reactions under severe conditions, while 1-pentene participates in various addition reactions, e.g. hydrogenation, hydration, halogenations, hydrohalogenation, polymerization. It is oxidized more easily compared to cyclopentane.

Cyclopentane and 1-pentene are different because of different structure.

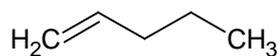
Cyclopentane is a cycloalkane:



cyclopentane

It has properties very similar to alkanes (smaller cycloalkanes: cyclopropane and cyclobutane are much more reactive due to the straight rings, but cyclopentane is not):

1-Pentene is an alkene:



pent-1-ene

It involves double bond, which determines its reactivity in the addition reactions.