

Trends of branched and straight chain hydrocarbons

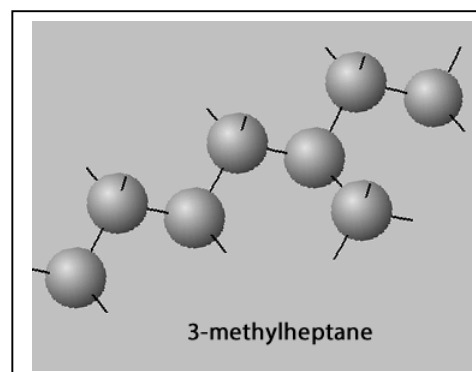
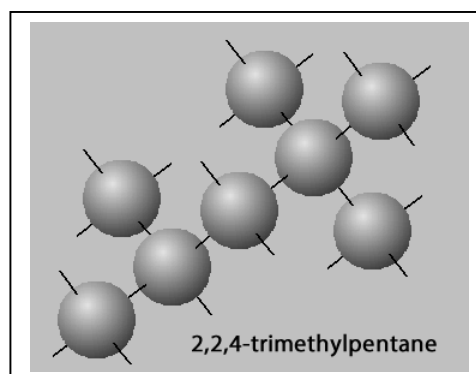
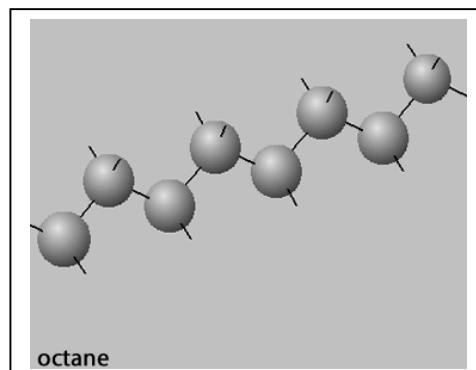
1) Consider the molecular structures of three isomers with the molecular formula C_8H_{18} .

a. Place the 3 isomers in order of increasing boiling point.

Octane

3-methylheptane

2,2,4-trimethylpentane



b. Justify your answer to question a. above.

Since octane is the only straight chain isomer it will have the highest boiling point as it has the highest surface area of all three molecules. 3-methyl heptane has next highest boiling temperature as it is only slightly branched when compared to 2,2,4-trimethylpentane. The more branching the more spherical a molecule becomes and hence the less surface area available to interact with other molecules.

c. Write the semi-structural formula of 2,5-dimethylhexane in the space provided and suggest where it would fit in the order you have given in question a. above.

It will most likely fall between

3-methylheptane and

2,2,4-trimethylpentane

d. Justify your answer.

2,5-dimethylhexane is more branched than 3-methylheptane and less branched than 2,2,4-trimethylpentane. For branched

isomers the greater the degree of branching the lower the boiling temp.

