

Gasoline



Gasoline prices are in the news daily as the cost at the pump fluctuates markedly from place to place. This challenge question, therefore, has to do with petroleum and the refining of petroleum for making gasoline.

1. What is meant by "unbranched" and "branched" hydrocarbons?
2. Make a table containing the first ten straight-chain alkanes, their molar masses and their boiling points. Graph the boiling points vs. the molar masses. What kind of relationship, if any, do you see between the increase in molar mass and the resulting boiling point? Explain this difference in terms of the effect of molar mass on the strength of the IMFs.
3. Consider C_4H_{10} and C_5H_{12} alkanes. What is the effect of branching on the boiling points of these two groups of alkanes? (Try to check for all isomers.)
4. What is meant by "octane rating" for gasoline? How is it determined? Can a compound have an octane rating higher than 100? Lower than 0? If your answer to either is no, explain why not. If your answer to either is yes, explain their significance.
5. Find a schematic diagram showing the fractional distillation of crude oil and describe how it works.