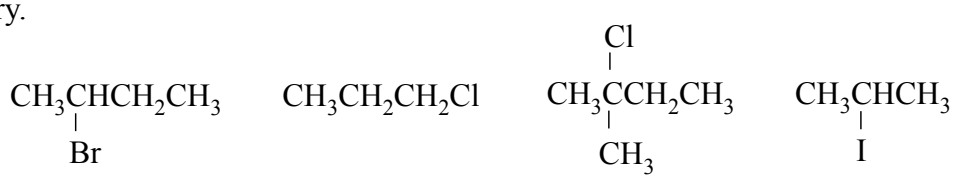
HALOGENOALKANES: INTRODUCTION

1. Give the name of each of the following halogenoalkanes, and say whether it is primary, secondary or tertiary.

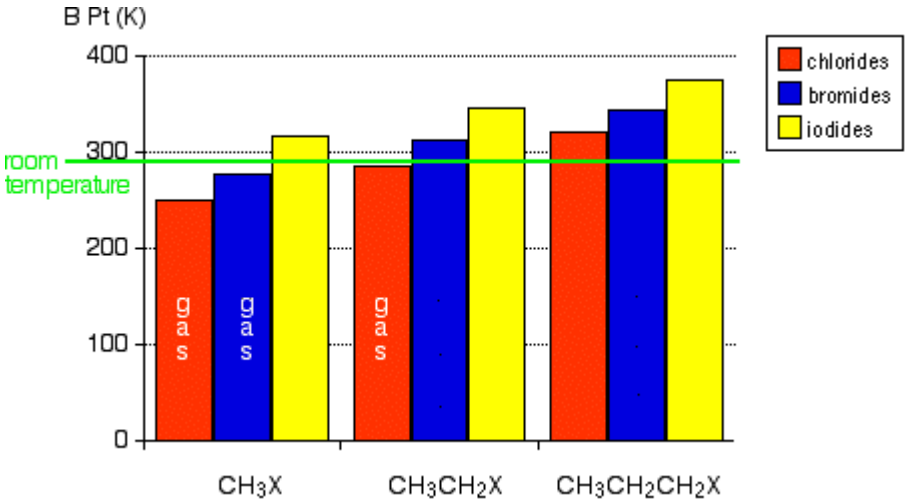


A B C D

2. The electronegativity values for C, F, Cl, Br and I are

C 2.5	F 4.0
	Cl 3.0
	Br 2.8
	I 2.5

The following diagram taken from the Chemguide page shows the boiling points of various small halogenoalkanes:

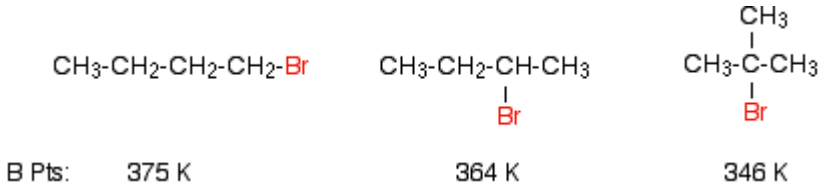


a) Which types of intermolecular forces are there between halogenoalkane molecules?

b) Explain the pattern of boiling points in the CH_3CH_2X compounds shown in the diagram.

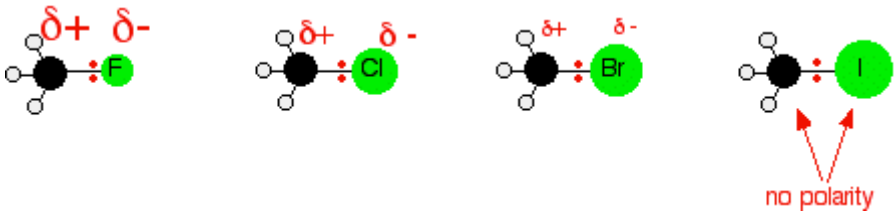
c) Explain what happens to the boiling points of the halogenoalkanes as the carbon chain grows.

d) Explain the pattern in boiling points of the following isomers (diagram from the same Chemguide page):



e) Why is 1-chloropropane virtually insoluble in water?

3. The next diagram, also taken from the same Chemguide page, shows the polarity of the various carbon-halogen bonds in a simple series of halogenoalkanes.



Most halogenoalkanes react with hydroxide ions, OH^-. In the case of the molecules above, the reactions work by a lone pair on the negatively charged oxygen being attracted to the slightly positive carbon atom. A new dative covalent (coordinate) bond is formed between the oxygen and the carbon, and the halogen is pushed off as a halide ion carrying the electrons in the original bond with it.

You might expect that the fluoromethane would be much more attractive to the hydroxide ions than the iodomethane is, and so the reaction would be much faster. In fact, fluoromethane doesn't react with the hydroxide ions at all, and reactivity increases as you go across the series towards iodomethane.

Explain why this happens.