Oxford Cambridge and RSA

AS Level Chemistry A

H032/01 Breadth in chemistry

Question Set 20

1. This question is about halogens and halides.

(a) The boiling points of the halogens are shown in the table.

Halogen	Boiling point /K
fluorine	85
chlorine	239
bromine	332
iodine	457
astatine	503

Explain the trend in boiling points of the halogens.

[3]

a) as you go down the group the boiling point increases because the halogen molecules get larger and the number of electrons increases, therefore there are more induced dipoles and instantaneous dipoles. Also, electron shielding increases and outweighs the nuclear attraction.

(b) You are supplied with a sample of ammonium bromide. → NH_4Br

Describe simple tests that would identify the cation and anion present in ammonium bromide.

Include reagents, expected observations and relevant equations.

[5]

b) For the NH_4^+ ion, add dilute sodium hydroxide solution to the sample in a boiling tube and heat. If ammonium ions are present, they will be converted to ammonia gas. Then you would hold dampred litmus paper in the opening of the boiling tube and it would turn blue. Ammonia also has a choking smell.

$$NH_{4(aq)}^+ + OH_{(aq)}^- \longrightarrow NH_{3(g)} + H_2O_{(l)}$$

For the Br^- ion, you would add aqueous silver nitrate solution to the sample in a boiling tube and warm gently. A cream precipitate of AgBr would form, which would dissolve upon addition of concentrated NH_3

$$Ag_{(aq)}^+ + Br_{(aq)}^- \longrightarrow AgBr_{(s)}$$

Total Marks for Question Set 20: 8