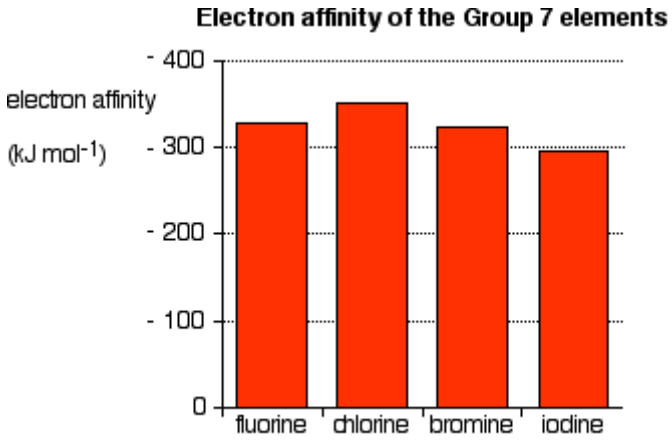
GROUP 7: PROPERTIES OF THE ELEMENTS

1. Define electronegativity, and explain how and why it changes as you go down Group 7.

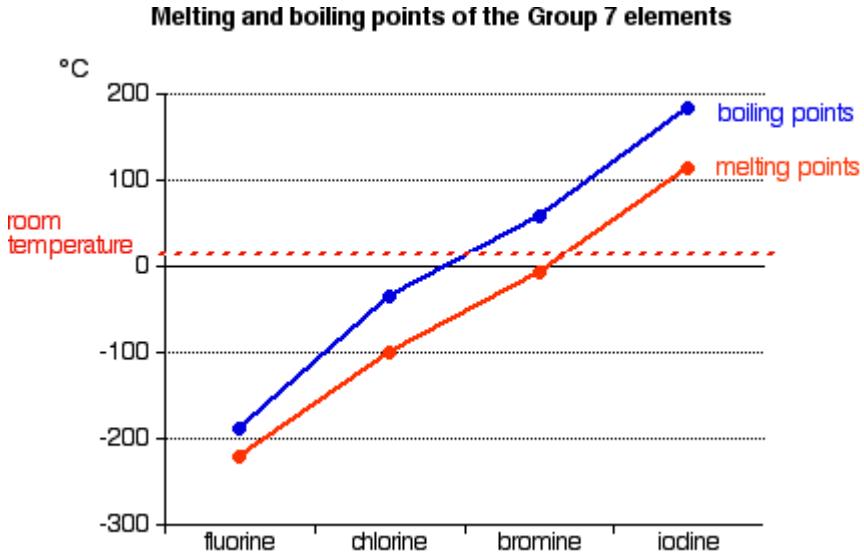
2. The first electron affinities of the Group 7 elements are shown in this chart taken from the Chemguide page.



a) Explain why the electron affinities tend to fall (in the sense of less heat being given out) as you go down the Group.

b) Explain why fluorine is an exception, with a smaller electron affinity than might be expected from its position in the Group.

3. The next diagram shows the trends in melting points and boiling points for the Group 7 elements.



Explain why both increase as you go down the Group.

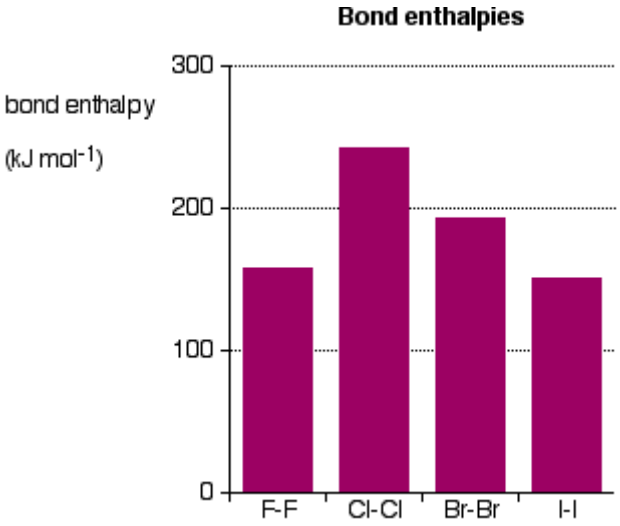
4. a) Fluorine reacts with water, but the other halogens are only very sparingly soluble in water. The chlorine that does dissolve reacts with water reversibly to a reasonable extent. Write the equation for the reaction involved, and name the products.

   b) Although iodine is only very, very slightly soluble in water, it does dissolved freely in potassium iodide solution to give a dark red-brown solution. Explain why.

   c) Chlorine, bromine and iodine are all much more soluble in organic solvents such as hexane than they are in water. Explain why.

5. a) The bond enthalpies for the halogen-halogen bonds in the various molecules, X_2, are shown in the chart.

   Explain the general trend, and why fluorine is exceptional.



   b) The bond enthalpies for the H-halogen bonds in H-X are shown in this chart.

   Explain the pattern in this case, in particular why the H-F value doesn't break the trend.

   c) Comment on the way the thermal stability of the hydrogen halides changes down the Group