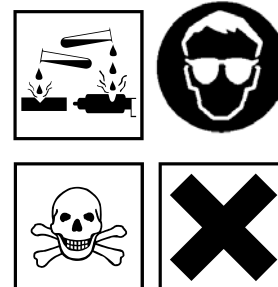


Displacement reactions of the halogens

Aims

You will use displacement reactions to work out a reactivity series for chlorine, bromine and iodine. Remember that a more reactive halogen will displace a less reactive halogen from its compounds in solution.



Apparatus

Goggles	Teat pipettes	
Bench mat	0.2M potassium chloride solution ☒	chlorine water ☒☒
Test tube	0.2M potassium bromide solution ☒	bromine water ☒☒
Test tube rack	0.2M potassium iodide solution ☒	iodine water ☒

Methods

- Copy the table shown below.
- Add about 1cm³ (about half a pipette-full) of potassium bromide solution to the test tube.
- Add **one** drop of chlorine water and gently shake the test tube to mix the contents.
- If you see a colour change, make a note of it in your table.
If you do not see a colour change, add up to 9 more drops of chlorine water (remembering to shake the test tube after each drop) and make a note of any colour change in your table.
If you still do not see a colour change, write **No reaction** in your table.
- Wash out your test tube.
- Repeat steps 2 – 5 for each of the following combinations:

chlorine water added to potassium iodide	iodine water added to potassium chloride
bromine water added to potassium chloride	iodine water added to potassium bromide
bromine water added to potassium iodide	

Results

	potassium chloride	potassium bromide	potassium iodide	number of reactions
chlorine water	No reaction			
bromine water		No reaction		
iodine water			No reaction	

Analysis

Count the number of reactions seen in each row and write the results in your table – the halogen that produces the most reactions is the most reactive of the three.

- Write the names of the halogens in order of reactivity, from the most reactive to the least.
- Compare your reactivity series with group 7 in the periodic table – what do you notice?
- What results might you get if fluorine water and potassium fluoride were in the experiment too?
- Write word and symbol equations for each of the reactions seen in the experiment. For example:

chlorine + potassium bromide → potassium chloride + bromine

