

# Chemistry halide ions essay sample



**ASSIGN  
BUSTER**

**Purpose:**

There are four halide salts used in this experiment that are found in the human body. Sodium fluoride is poisonous, but has been traced to be beneficial to humans in the prevention of tooth decay. Sodium chloride is added to many of our foods to increase flavor. Sodium chloride is important for many life processes, but too much intake is linked to high blood pressure. Sodium bromide is distributed throughout body tissues. Sodium iodine controls cell growth. The principal oxidation number of the halogens is -1. All halogens, except fluorine have other oxidation numbers. In this experiment the production of recognizable precipitates and complex ions will be found. Observations will be used to determine the halide ion presented in the unknown solution. Hypothesis:

If the halide ions react, then the production of precipitate and complex ions will be recognizable. Materials:

- \* 24-well microplate
- \* AgNO<sub>3</sub>, 0. 1 M
- \* Ca(NO<sub>3</sub>)<sub>2</sub>, 0. 5 M
- \* Gloves
- \* KBr, 0. 2 M
- \* KI, 0. 2 M
- \* Lab apron
  
- \* Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, 0. 2 M
- \* NaCl, 0. 1 M
- \* NaF, 0. 1 M

- \* NaOCl (commercial bleach), 5%
- \* NH<sub>3</sub>(aq), 4 M
- \* Safety goggles
- \* Starch solution, 3%
- \* Thin-stemmed pipets (12)

Procedure:

- 1.) Put on safety goggles, gloves, and a lab apron.
- 2.) Put 4 drops of 0.1 M NaF into each of four wells in the 1st row. Put 4 drops of 0.1 M NaCl into each of the four wells in the 2nd row. Put 4 drops of 0.2 M KBr into each of the four wells in the 3rd row. Put 4 drops of 0.2 M KI into each of the four wells in the 4th row. Put 4 drops of the single unknown solution into each of the four wells in the 5th row. Put 4 drops of the double unknown solution into each of the four wells in the 6th row.
- 3.) Add 4 drops of 0.5 M Ca(NO<sub>3</sub>)<sub>2</sub> solution to each of the four halide solutions in column 1. Add 4 drops of 0.1 M AgNO<sub>3</sub> solution to each of the four halide solutions in column 2. Add 4 drops of 0.1 M AgNO<sub>3</sub> + 4 M NH<sub>3</sub> solution to each of the four halide solutions in column 3. Add 4 drops of 0.1 M AgNO<sub>3</sub> + 0.2 M Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> solution to each of the four halide solutions in column 4. Add 4 drops of 5% NaOCl + 3% starch solution to each of the four halide solutions in column 5.
- 4.) Record observations.
- 5.) Rinse the microplate into a trough or dishpan provided by your teacher. Clean all apparatus and your lab station. Return equipment to its proper place. Dispose of chemicals and solutions in the container designated by your teacher. Do not pour any chemicals down the drain or in the trash

unless your teacher directs you to do so. Wash your hands thoroughly before you leave the lab and after all work is finished. Results:

### Results of the Reactions of Halide Salts

Halide Salts| Ca(NO<sub>3</sub>)<sub>2</sub>| AgNO<sub>3</sub>| AgNO<sub>3</sub>

+

NH<sub>3</sub>| AgNO<sub>3</sub>

+

Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>| NaOCl

+

starch|

NaF| N/A| N/A| Off white PPT| Brown PPT| N/A|

NaCl| N/A| N/A| Brown PPT| Brown PPT| N/A|

KBr| N/A| Gray PPT| Gray PPT| Clear/Brown PPT| N/A|

KI| N/A| Yellow PPT| Yellow PPT| Yellow/ Brown PPT| N/A| Single unknown| N/A|

Flaky/Gray PPT| Gray PPT| Clear/Brown PPT| N/A| Double unknown| N/A| Off white PPT| Clean/Brown PPT| Brown PPT| N/A|

The chart above shows the observations and information collected during this experiment. The letters “ N/A” means that there was no reaction or show of a precipitate. The color followed by the letters “ PPT” means that there was a reaction showing the recognizable precipitates and what color they were. Conclusion:

Halide ions are very reactive. Fluorine (F) ions are present in the equation:  $Ag^+ + F^- \rightarrow AgF(s) + H_2O(l)$ . Chlorine (Cl) ions are present in the equation:  $Ag^+ + Cl^- \rightarrow AgCl(s) + H_2O(l)$ . Bromine (Br) ions are present in the equation:  $Ag^+$

+Br- AgBr(s) + H<sub>2</sub>O(l). Iodine (I) ions are present in the equation: Ag<sup>+</sup> + I<sup>-</sup> AgI(s) + H<sub>2</sub>O(l). The generalizations that can be made about silver halides is that when it is mixed with different reactants it reacts making the production of precipitates and complex ions recognizable. The single unknown contains the halide salt KBr. The double unknown contains the halide salt NaF. I know this because the unknown halide salts react the same way as KBr and NaF.