Halide Tests for Nucleophilic Substitution

Silver Nitrate

The conditions of the test cause the reaction to proceed via an S_N1 mechanism.

$AgNO_3 + RX \rightarrow AgX_{(s)} + RONO_2$

1. Add 2 mL of 0.2 M $AgNO_3$ in ethanol to a test tube.
2. Add one drop of the alkyl halide to the test tube and mix by gently shaking.
3. Record the time it takes for a precipitate forms.
4. If no precipitate forms after 5 minutes, place test tube into a beaker of warm water (78 °C).
5. If no change occurs after 5 minutes, remove the test tube and clean up.

Note: the color of the precipitate indicates the halide

White	AgCl
Pale yellow	AgBr
Dark yellow	AgI

Sodium Iodide

The conditions of the test cause the reaction to proceed via an S_N2 mechanism.

$NaI + RX \rightarrow NaX_{(s)} + RI$

1. Add 1 mL of the sodium iodide solution (in acetone) to a test tube.
2. Add two drops of the alkyl halide to the test tube and mix by gently shaking the test tube.
3. Record the time it takes for a precipitate forms.
4. If no precipitate forms after 3 minutes, place test tube into a beaker of warm water (50 °C).
5. If no change occurs after 5 minutes, remove the test tube and clean up.