<table>
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<th>Learning Objectives</th>
<th>Keypoints</th>
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| Describe tests to detect sulfates, carbonates and halides                         | To detect sulfates:                                                                                      | Add a few drops of dilute HCl. Add a few drops of barium chloride. A white precipitate of barium sulfate is a positive result.  
$$\text{Ba}^{2+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) \rightarrow \text{BaSO}_4(\text{s})$$ |                                                                                  |
|                                                                                  |                                                                                                           | To detect carbonate ions:                                                                                         | Add a few drops of dilute hydrochloric acid. Bubbles of a gas (carbon dioxide) are a positive result.  
$$2\text{H}^+(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$$ |                                                                                  |
|                                                                                  | To detect halide ions:                                                                                  | Add a few drops of nitric acid. Add a few drops of silver nitrate solution. Record the colour of the precipitate    | Chloride = white precipitate, bromide = cream precipitate, iodide = yellow precipitate  
$$\text{AgNO}_3(\text{aq}) + \text{X}^{-}(\text{aq}) \rightarrow \text{AgX}(\text{s}) + \text{NO}_3^{-}$$ (where $\text{X} = \text{Cl}$, $\text{Br}$ or $\text{I}$) |

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