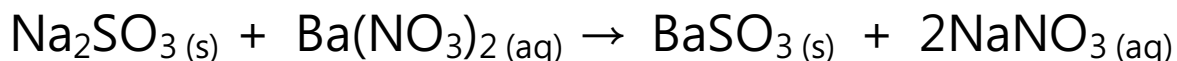


Test for sulfates

Most sulfates are soluble in water, but barium sulfate however is insoluble. So, to test for a sulfate ion (SO_4^{2-}), add a few drops of barium nitrate solution, $\text{Ba}(\text{NO}_3)_2$ (aq), to a solution of the unknown substance. If you get a white precipitate it indicates that barium sulfate is present, which tells you your unknown substance is a sulfate. However, you need to be careful you don't end up with a false positive due to carbonate or sulfite ions.

Example

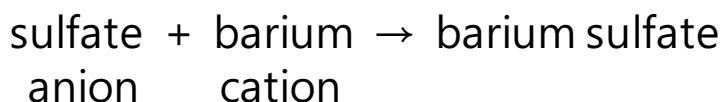
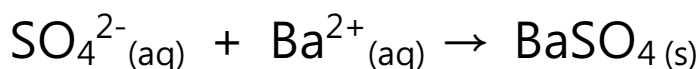
Sodium sulfite reacts with a solution of $\text{Ba}(\text{NO}_3)_2$ to make barium sulfite and sodium nitrate:



Barium sulfite is a white precipitate, which can confuse the results of a test for sulfates.

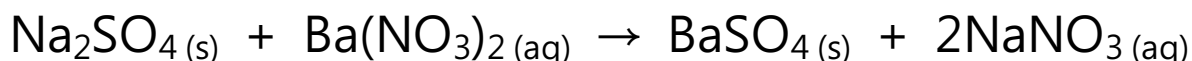
Before you add any barium nitrate you'll need to add dilute acid in order to remove any carbonate or sulfite ions that may be in the solution.

Now that you have got rid of any carbonates or sulfites, if a white precipitate is formed from the reaction with barium nitrate solution, it can only mean that sulfate ions are present. The ionic equation for this reaction is:



Example

Sodium sulfate reacts with a solution of $\text{Ba}(\text{NO}_3)_2$ to make barium sulfate and sodium nitrate:



If no precipitate is formed, this means you don't have any sulfate ions present.