

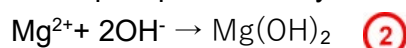
I found the ions Magnesium (Mg^{2+}) and Chloride (Cl^-). Together they make Magnesium Chloride (MgCl_2)

MgCl_2

I tested the cation first.

First I added two drops of Sodium-hydroxide. The solution turned white and cloudy. This means a white precipitate formed. This means that the ion can't be Na^+ , Fe^{2+} , Fe^{3+} , Cu^{2+} or Ag^+ as they don't form white precipitates with Hydroxide. Ag^+ does technically form a white precipitate with hydroxide but it is unstable and turns into water and the brown silver-oxide we see. 5

White precipitate with hydroxide and magnesium.



Next I added excess Sodium-hydroxide. Nothing happened. This means the ion can't be Zn^{2+} , Pb^{2+} or Al^{3+} as they form complex ions with excess hydroxide. The ion must be Mg^{2+} or Ba^{2+} .

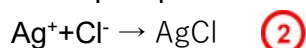
I added sulfuric acid to a new sample. Nothing happened. 1

Then I tested the anion.

First I put a piece of red litmus paper in the solution. The paper remained red. This means that the ion is not alkaline. This means that the ion isn't CO_3^{2-} or OH^- as they are both alkaline.

Next I added some Silver-nitrate. The solution turned cloudy white. This means a precipitate formed. This means that the ion is Chloride or Iodide as their rule states that most chlorides and iodides are soluble except with silver or lead. All nitrates are soluble as are all sulfates except calcium, barium and lead.

White precipitate with Silver and Chloride



Finally I added excess Ammonia. The solution turned clear and colourless. This means that a complex ion formed. A complex ion won't form from silver iodide but will from silver chloride. 4
The complex ion is $\text{Ag}(\text{NH}_3)_2^{1+}$

Complex ion with silver and ammonia



The contamination of magnesium in our water supply is not worrying. Although an excess of magnesium can cause hypermagnesemia which has symptoms like low blood pressure, nausea, vomiting, headaches and confusion along with others it usually doesn't affect a person with functioning kidneys. Excess magnesium can also cause diarrhoea but this usually only occurs with supplements (magnesium pills) but not in a diet.

A more common issue related to magnesium is the lack of it in our body. Magnesium is important for around 350 different enzymes of which many are used to make energy. It is also important in the making of nucleic acids and sensitivity to insulin. It is the fourth most common cation in the human body. Magnesium deficiency has been related to chronic drinking and lack of absorption through the gut. Some drugs used for medical purposes have been found to increase the loss of magnesium as well. Magnesium deficiency can cause: nausea, vomiting, loss of appetite, fatigue, muscle weakness, cramps and twitches, irregular heartbeats and mineral deficiency (particularly low potassium and calcium). 60 percent of the roughly 25 grams of magnesium is in our bones. Low levels of magnesium can cause weaker, less dense bones. In fact magnesium is used medically. As it is needed for insulin sensitivity it can be used to help control type two diabetes. Magnesium has also been correlated with a lack of certain heart diseases, type two diabetes and eclampsia. Other medical conditions have been correlated to magnesium but the tests aren't confirmed. Magnesium has also been shown to protect against atherosclerosis in animals.

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The effects of the magnesium will only be seen if the magnesium is in high concentration however. I have only tested for what ion it is not how concentrated it is.