

Chem!stry

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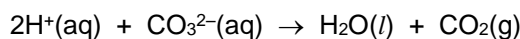
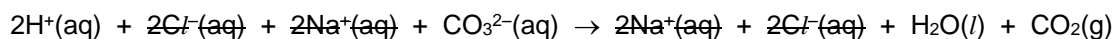
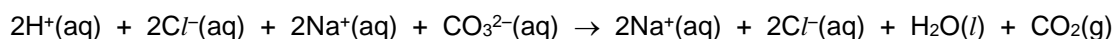
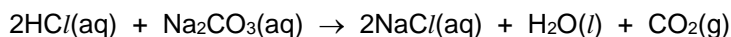
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Ionic Equations

An ionic equation is a form of chemical equation that clearly and concisely communicates the important changes taking place during a chemical reaction. Ions that do not change during the course of the reaction (called *spectator ions*) are eliminated from the equation, leaving the focus on the ions that are reacting. Prior knowledge: You will need to know how to write balanced chemical equations and recall the solubility rules for ionic compounds (in order to determine which chemicals will dissolve in water to produce ions).

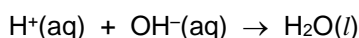
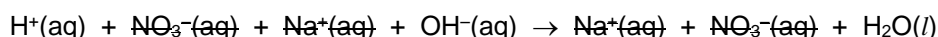
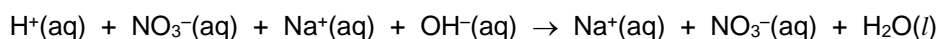
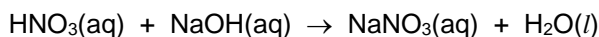
Example One:



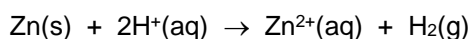
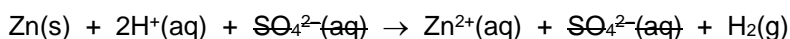
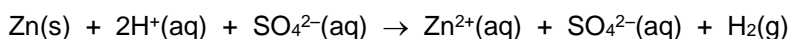
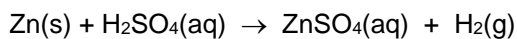
Example Two:



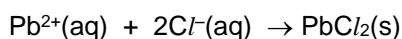
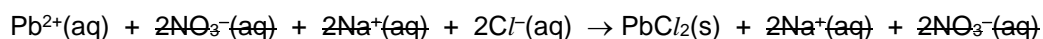
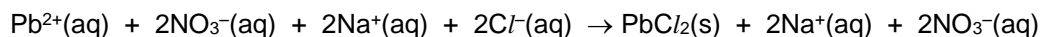
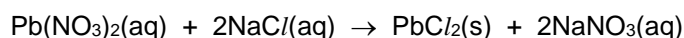
Example Three:



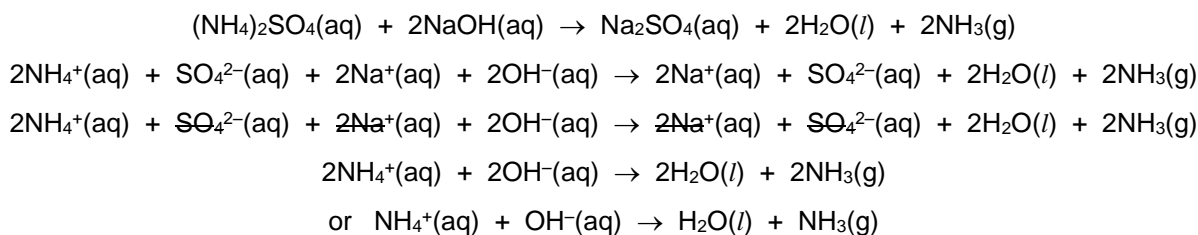
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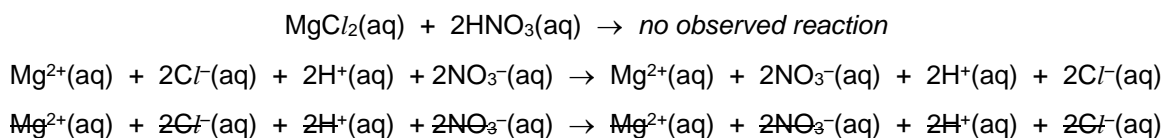
Example Five:



Example Six:



Example Seven:



Note: Any attempt to write an ionic equation for this reaction results in *all of the ions being cancelled out*.

Conclusion: There is no ionic equation for this particular reaction, which indicates that *no reaction will actually take place* when an aqueous solution of magnesium chloride is added to a solution of nitric acid.

Question One:

Complete and balance each one of the following chemical equations and then write the ionic equation for the reaction:

- a) $\text{NaOH}(\text{aq}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow \dots\dots\dots$
.....
- b) $\text{ZnCO}_3(\text{s}) + \text{HCl}(\text{aq}) \rightarrow \dots\dots\dots$
.....
- c) $\text{Mg}(\text{s}) + \text{HCl}(\text{aq}) \rightarrow \dots\dots\dots$
.....
- d) $\text{Ba}(\text{NO}_3)_2(\text{aq}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow \dots\dots\dots$
.....
- e) $\text{Na}_2\text{CO}_3(\text{aq}) + \text{HCl}(\text{aq}) \rightarrow \dots\dots\dots$
.....
- f) $\text{Pb}(\text{NO}_3)_2(\text{aq}) + \text{K}_2\text{SO}_4(\text{aq}) \rightarrow \dots\dots\dots$
.....

Question Two:

For each one of the following word equations, write both the balanced chemical equation as well as the ionic equation:

- a) silver nitrate solution + sodium chloride solution $\rightarrow \dots\dots\dots$
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- b)** potassium carbonate solution + hydrochloric acid →
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- c)** ammonium nitrate solution + sodium hydroxide solution →
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- d)** copper(II) sulphate solution + calcium nitrate solution →
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- e)** magnesium + sulphuric acid →
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- f)** zinc oxide + nitric acid →
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- g)** sodium hydroxide solution + iron(II) nitrate solution →
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- h)** lead(II) nitrate solution + sodium sulphate solution →
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.....
- i)** barium nitrate solution + magnesium sulphate solution →
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.....
- j)** sodium hydroxide solution + phosphoric acid →
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- k)** ammonium chloride solution + sodium hydroxide →
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.....
- l)** copper(II) sulfate solution + sodium hydroxide →
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Question Three:

Look back at the balanced chemical equations and ionic equations that you have written. What *generalisations* can you make about each of the following types of reactions – think, what essential characteristics do they have in common / share?

a) acid + metal reactions – **1. c)** and **2. e)**.

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b) acid + alkali reactions – **1. a)** and **2. j)**.

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c) acid + carbonate reactions – **1. b)** and **1. e)** and **2. b)**.

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d) ammonium salt + base – **2. c)** and **2. k)**.

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e) ionic precipitation reactions – **1. d)** and **1. f)** and **2. a)** and **2. d)** and **2. g)** and **2. h)** and **2. i)** and **2. l)**.

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- Scan the QR code below for the answers to this assignment.



http://www.chemist.sg/formulae_equations/ionic_equ_ans.pdf