Chem1311Ch4Ep4Transcript

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Hello and welcome to the 4th episode of Reactions in Aqueous Solutions.

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Previously in reactions in aqueous solutions.

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We considered several properties of acids and bases.

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We learned the Arrhenius and Bronsted definitions of acids and bases.

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And we learned to identify Bronsted acids and bases.

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In today's episode.

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We will identify neutralization and neutralization with gas evolution reactions.

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We will predict the products of neutralization and neutralization with gas evolution reactions.

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And we will write ionic and net ionic equations for neutralization and neutralization with gas evolution reactions.

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The neutralization reaction takes place between an acid and a base.

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This type of reaction will always take place as long as an acid and a base.

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Are the reactants.

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This is the neutralization reaction of hydrochloric acid and sodium hydroxide.

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It is a double displacement reaction.

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So you can predict the products.

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By pairing up each cation with the opposite anion.

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To write the Ionic equation.

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Follow the same rule we used for precipitation reactions.

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Write all the aqueous compounds as the ions that make up the compound.

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Notice that water does not get separated because it is not aqueous.

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Gases also stay together just like solids and liquids.

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Next, we proceed to cancel the spectator ions.

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And we are left with the net Ionic equation.

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At this point, you have always separated.

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All the aqueous substances into their ions.

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However, aqueous weak acids should not be separated into ions.

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Yes, I was withholding information again.

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Please forgive me.

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The reaction between a weak acid and a base is essentially the same as with a strong acid.

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But the ionic and net Ionic equations look a little bit different.

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You can still predict the products by switching the cations and on ions.

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But when you write the Ionic equation, the weak acid is now separated into ions.

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We then cancel the spectator ions.

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And we are left with a net Ionic equation.

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Let's practice some.

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Write the molecular, ionic, and net ionic equations for each of the following reactions.

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Pause the video.

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Write down your answers and then come right back.

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Don't forget to check whether the acid is strong or weak.

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Welcome back.

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We will start by predicting the products and verifying whether they are aqueous or solid.

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Next, we wrote the Ionic equation.

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We separated hydrobromic acid into its ions because it is a strong acid.

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Next we canceled the spectator ions.

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And we are left with a net Ionic equation.

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Should we simplify?

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You may, but you don't have to.

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For the second example.

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We'll predict the products and write the balanced equation.

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Sulfuric acid is a strong acid, but only the first proton.

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The second one is weak.

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So we separate the first hydrogen, but we leave the second hydrogen attached.

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Next, we cancel all spectator ions.

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And we are left with a net Ionic equation.

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For the third example, we predict the products.

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We check the solubility table, and balance the equation.

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Acetic acid is a weak acid and magnesium hydroxide is a solid.

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So they both stayed together.

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We then cancelled the spectator ions.

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Well, we tried.

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So in this case there are no spectator ions and the ionic and net ionic equations are the same.

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The third type of double displacement reaction.

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Is the neutralization reaction with gas evolution.

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It is very similar to the neutralization reaction.

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Except that the base must be a carbonate or bicarbonate instead of a hydroxide.

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The first example is hydrochloric acid, a strong acid reacting with sodium carbonate.

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Notice that water and carbon dioxide are always produced in equal amounts.

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This will help with the balancing.

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Hydrochloric acid is a strong acid, so it will separate into ions and only water which is a liquid and carbon dioxide, which is a gas, remained together for the Ionic equation.

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We then proceed to cancel spectator ions.

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And what remains is the net Ionic equation.

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Here's another example, this time with a weak acid.

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The weak acid remains together for the Ionic equation.

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So do water and carbon dioxide for the same reason we stated before.

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Next we cancelled the spectator ions.

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And what's left is our net Ionic equation.

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OK, write the molecular, ionic, and net ionic equations for the following neutralization with gas evolution reactions.

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Pause the video.

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Write down your answers and then come right back.

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Welcome back.

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For the first example.

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Make sure that the products include water and carbon dioxide.

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Hydrobromic acid is a strong acid, so it will separate it into its ions.

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Next we cancel all spectator ions.

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And we are left with the net Ionic equation.

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For the second example, again.

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We make sure that water and carbon dioxide are two of the products.

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And we balance the equation.

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Sulfuric acid is separated into ions, but the second hydrogen remains attached.

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Because it is a weak acid.

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Next we cancel the spectator ions.

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And we are left with the net ionic equation.

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For the third example, we follow the same procedure.

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And balance the equation.

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Acetic acid is a weak acid, so it remains together in the Ionic equation.

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Same as the water and carbon dioxide.

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We cancelled the spectator ions.

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And what is left is the net Ionic equation.

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So far we have considered all three types of double displacement reactions.

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It is time to check if you have it all sorted.

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Can you predict the products of a reaction even if you're not told what type it is?

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Do you know what substances to keep together and which to separate into ions,

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When you write an ionic equation?

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Can you identify the reaction type from its molecular equation?

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Can you identify it from its net Ionic equation?

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Can you identify the seven strong acids?

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Can you identify Bronsted acids and bases?

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If you need help or have some questions with any of these skills.

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Please visit with me using the office hours link or the discussion link in canvas.

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Because that's all there is.

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There isn't any more.