



## Synthesis

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### Transcript

Instructor: Andi

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**Instructor:** Video, we are going to do an example synthesis problem. So when I'm doing synthesis problems, I like to look for each individual piece, it's a puzzle, rather than looking at the molecule as a whole because it can get to be a little bit overwhelming. So for our starting material, we will have a benzene and a ketone to make this final product here. So when I start my synthesis questions, I like to look for the puzzle pieces, looking for the um, starting material in the final product. In this one, we can see we've got our benzene ring right here and then we have our aldehyde right here.

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**Instructor:** We'll start off with our benzene ring here. We will start off with a bromination of the benzene ring to add a bromine onto it. All of the carbons in this benzene ring are equal, so it doesn't matter what position you're adding your bromine onto. From there, we are ready to form our grignard. We will use the benzene as the grignard as it will be the one that is attacking at the Delta positive position.

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**Instructor:** Delta positive carbon right here. Right. So after we have added the MG and Ether, we get our MGBR attached to our benzene ring, so our Grignard. From there, we are able to start working on our second piece of the puzzle, which will be combining the two of these. Okay, so we've made our first piece of the puzzle.

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**Instructor:** So we've made our benzene with our grignard on it. From there, we are able to add our second piece of the puzzle, which is our aldehyde here. So we take our benzene with the grignard on it, and then we have our two different reaction conditions. So our aldehyde in ether and then our acid workup with the  $\text{H}_3\text{O}^+$ . Do you know So the delta negative carbon right here off our benzene is going to go to the carbonyl carbon of our aldehyde here.

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**Instructor:** The electrons are going to flow up to the oxygen, and the electrons then from the oxygen are going to come down here and snag a hydrogen off of this  $\text{H}_3\text{O}^+$ . And then this is going to form kind of our almost final product. We can see in our final product, we have a double bonded oxygen here. That means we need to do an oxidation reaction to turn our OH into a double bonded oxygen. We've drawn our new bond in pink here.

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**Instructor:** You can see that this is the new carbon carbon bond that we have formed from our Grignard. After we oxidate it using PCC and  $\text{CH}_2\text{Cl}_2$ , we get our final product here, which has our benzene ring, and then our ketone now attached. So a good thing to do after you think you've finished your synthesis. You think you have your final product is to count your carbons and make sure that you do have the correct amount because it is very easy to accidentally add an extra carbon in there and not realize it till you've already almost finished the synthesis. So to conclude this, we start with our bromination of our benzene, which then we'll add our bromine where we are able to add our grignard.

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**Instructor:** That is our step one to get the grignard. We know this one will be a grignard because it doesn't have the oxygen, so it will be the molecule that's doing the attack. Then for our step two, we add the pieces together. We have our grignard here. We have our aldehyde here with our oxygen.

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**Instructor:** We then attack, the carbon Delta negative carbon here, and this will form our intermediate almost product. From there, we will be able to do an oxidation. Using PCC is a little bit more controlled than say chromate, we are able to get our final product here.