

Names: \_\_\_\_\_  
Chem 227/ Dr. Rusay

### Carbonyls: Hydrolysis of Esters

1. Select a partner. Open the following page:

<http://chemconnections.org/organic/chem227/227assign-10.html#37>

Click on the link *Hydrolysis Rate of Esters*, View the movie and write a prelab for the procedure in one of the partner's notebooks.

Show the steps for the complete mechanism of the hydrolysis of ethyl benzoate in an aqueous solution of sodium hydroxide. Use arrows to indicate electron movements.

2. Draw structures for the esters: A = ethyl acetate, B = ethyl benzoate, C = ethyl butyrate, D = ethyl formate. Predict the ranking of the esters from the slowest reacting to the fastest.

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	Structure		$pH$ $t = 0$		$pH$ $t = 10$		$pH$ $t = 20$		$pH$ $t = 30$
<b>A</b>									
<b>B</b>									
<b>C</b>									
<b>D</b>									

(Over)

3. Rank the esters from the slowest reacting to the fastest based on your data.

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Compare the results with your predictions. Provide a brief hypothesis explaining the observed results and reconcile any differences with your predictions.

4. Rank the relative reactivities from the slowest to the fastest for the aqueous sodium hydroxide hydrolysis of A = ethyl benzoate, B = benzoyl chloride, and C = methyl benzamide. Draw the structure of the product of each and provide a mechanism for each reaction with arrows to indicate electron movements.

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