

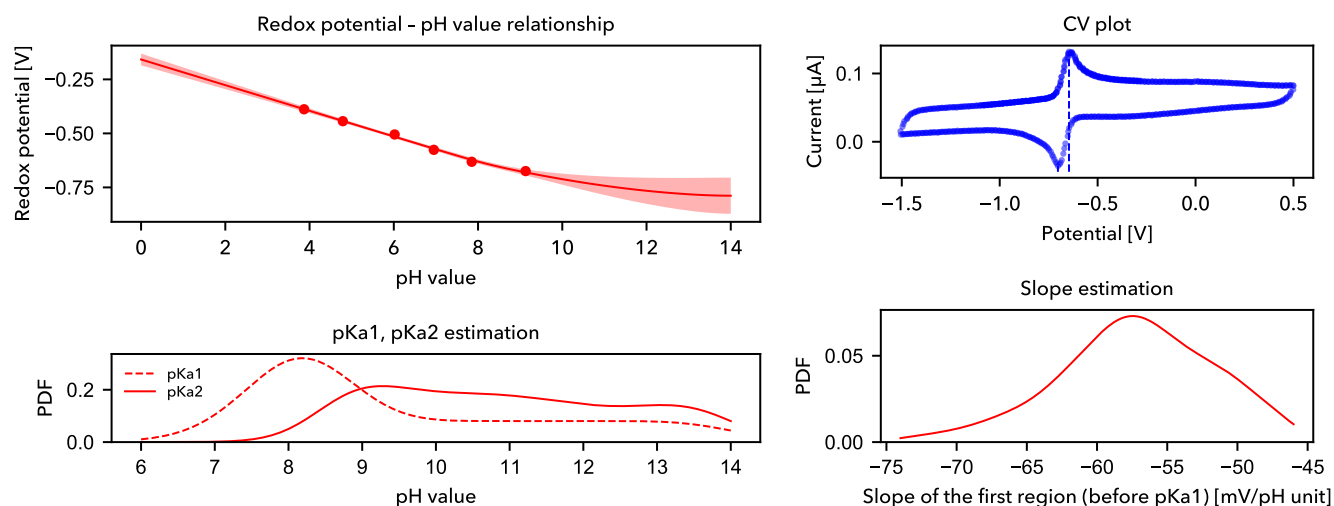
The series of experiments were conducted to measure the potential of a quinone solution at various pH levels, specifically from pH 7 to pH 9. The procedure involved adding 6 mL of buffer solution of the desired pH, 3 mL of NaCl solution, 15 mL of water, and 6 mL of quinone solution to a beaker. A CV scan was then run to measure the potential. The contents of the beaker were then transferred to a waste beaker. The observations showed that as the pH increased, the potential became more negative. The potential at pH 3.87 was -0.388 eV, at pH 4.79 was -0.443 eV, at pH 6.02 was -0.505 eV, at pH 6.95 was -0.576 eV, at pH 7.85 was -0.631 eV, and at pH 9.13 was -0.674 eV.

After performing the experiments, these are the results:

The estimate for pKa1 is 8.096.

The estimate for pKa2 is 12.380.

The estimate for slope is -60.958.



.....Log for experiment 1.....

This was the rationalization behind the experiment:

I want to measure the potential of the quinone solution at various pHs. I will start at pH 4 and take a measurement there. The experiments should measure the potential at all pHs from 4 to 9.

This was the experiment protocol that was done:

Add 6 mL of pH 4 buffer solution. Add 3 ml NaCl solution. add 15 mL of water followed by 6 mL of quinone solution. Then measure the pH and run a CV scan. transfer contents of beaker to waste beaker.

This was the expected output from the experiment:

The measured pH should be around 4 (a little difference is okay). Unsure what the potential should be since it's the first experiment, but the trend is that potential should become more negative as pH goes up.

This was the actual output from the experiment:

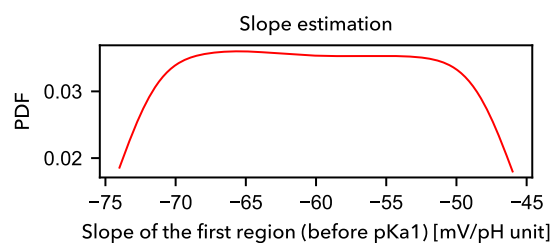
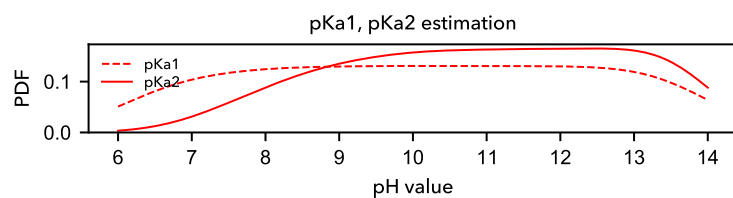
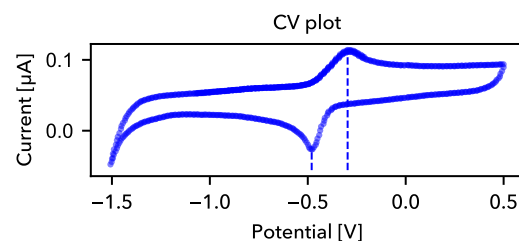
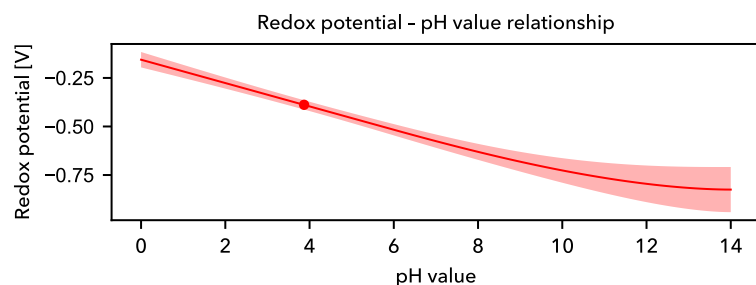
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[{'pH': 3.87, 'eV': -0.3883181818181818}]
```

After performing the experiments, these are the results:

The estimate for pKa1 is 6.047.

The estimate for pKa2 is 7.682.

The estimate for slope is -145.438.



.....Log for experiment 2.....

This was the rationalization behind the experiment:

Based on the previous experiment, the pH was slightly lower than expected, but within an acceptable range. The potential was also measured. Now, I will proceed to the next pH level, which is pH 5, and measure the potential there. I expect the potential to become more negative as the pH increases.

This was the experiment protocol that was done:

Add 6 mL of pH 5 buffer solution to the experiment beaker. Add 3 ml NaCl solution. Add 15 mL of water followed by 6 mL of quinone solution. Then measure the pH and run a CV scan. Transfer contents of beaker to the waste beaker.

This was the expected output from the experiment:

The measured pH should be around 5 (a little difference is okay). The potential should be more negative than the previous measurement at pH 4.

This was the actual output from the experiment:

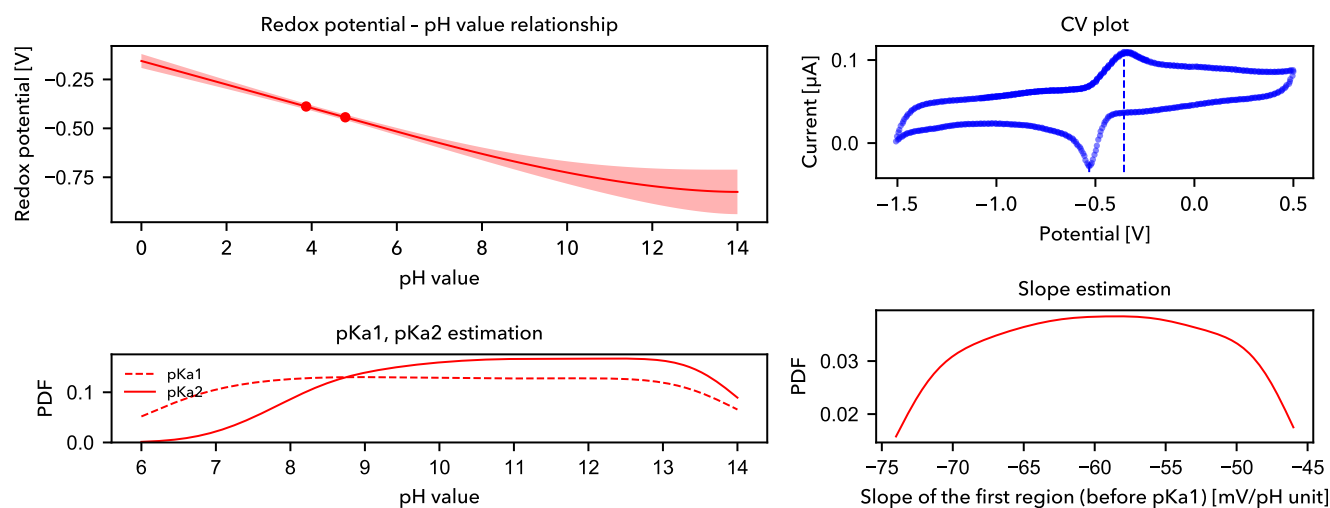
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[{'pH': 3.87, 'eV': -0.3883181818181818}, {'pH': 4.79, 'eV': -0.4434841666666667}]
```

After performing the experiments, these are the results:

The estimate for pKa1 is 10.707.

The estimate for pKa2 is 13.185.

The estimate for slope is -59.963.



.....Log for experiment 3.....

This was the rationalization behind the experiment:

Based on the previous experiments, the pH was slightly lower than expected, but within an acceptable range. The potential was also measured. Now, I will proceed to the next pH level, which is pH 6, and measure the potential there. I expect the potential to become more negative as the pH increases.

This was the experiment protocol that was done:

Add 6 mL of pH 6 buffer solution to the experiment beaker. Add 3 ml NaCl solution. Add 15 mL of water followed by 6 mL of quinone solution. Then measure the pH and run a CV scan. Transfer contents of beaker to the waste beaker.

This was the expected output from the experiment:

The measured pH should be around 6 (a little difference is okay). The potential should be more negative than the previous measurement at pH 5.

This was the actual output from the experiment:

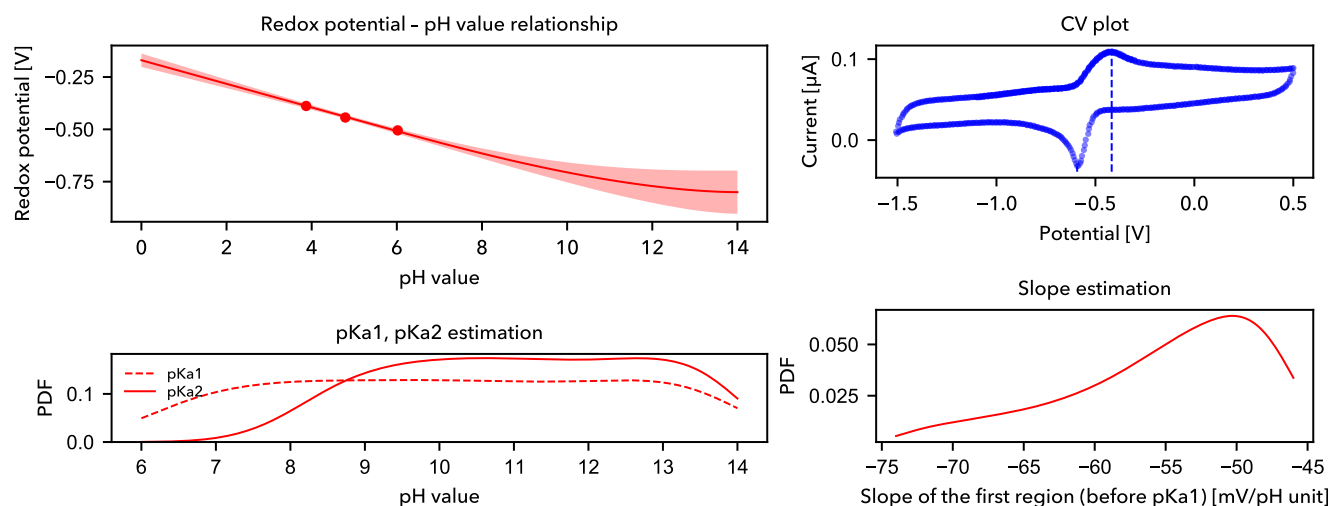
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[{'pH': 3.87, 'eV': -0.3883181818181818}, {'pH': 4.79, 'eV': -0.4434841666666667},  
{ 'pH': 6.02, 'eV': -0.5049748251748252}]
```

After performing the experiments, these are the results:

The estimate for pKa1 is 8.646.

The estimate for pKa2 is 18.752.

The estimate for slope is -54.026.



.....Log for experiment 4.....

This was the rationalization behind the experiment:

I want to measure the potential of the quinone solution at various pHs. I will start at pH 7 and take a measurement there. The experiments should measure the potential at all pHs from 7 to 9.

This was the experiment protocol that was done:

Add 6 mL of pH 7 buffer solution. Add 3 ml NaCl solution. add 15 mL of water followed by 6 mL of quinone solution. Then measure the pH and run a CV scan. transfer contents of beaker to waste beaker.

This was the expected output from the experiment:

The measured pH should be around 7 (a little difference is okay). Unsure what the potential should be since it's the first experiment, but the trend is that potential should become more negative as pH goes up.

This was the actual output from the experiment:

```
[{'pH': 3.87, 'eV': -0.3883181818181818}, {'pH': 4.79, 'eV': -0.4434841666666667},  
{ 'pH': 6.02, 'eV': -0.5049748251748252}, {'pH': 6.95, 'eV': -0.57605}]
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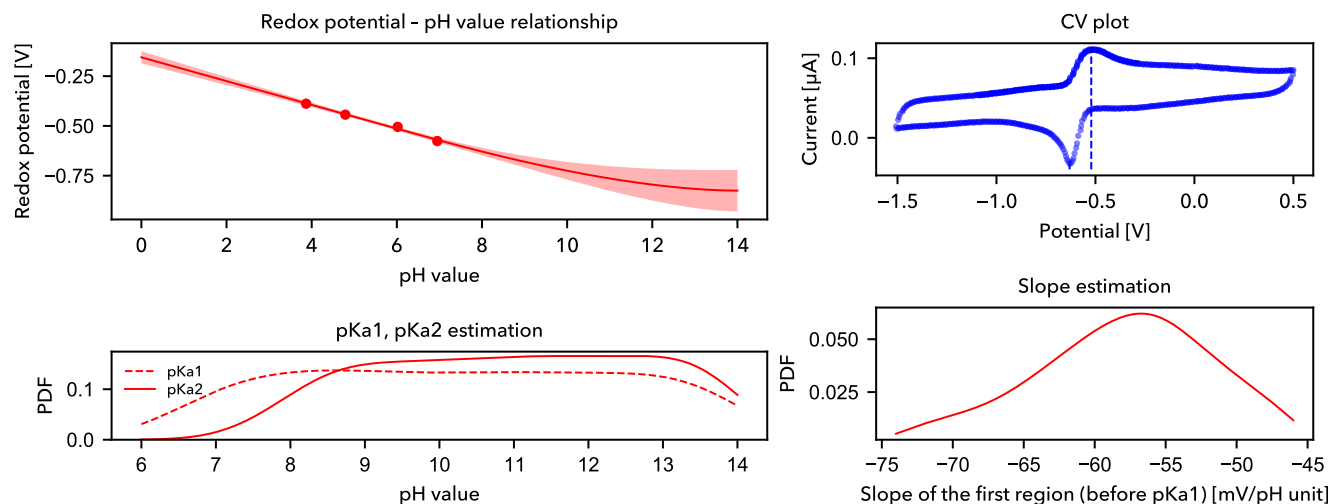
A human was asked to intervene in the experiment, and this was their feedback:
go

After performing the experiments, these are the results:

The estimate for pKa1 is 7.303.

The estimate for pKa2 is 19.501.

The estimate for slope is -59.451.



.....Log for experiment 5.....

This was the rationalization behind the experiment:

Based on the previous experiment, the potential became more negative as the pH increased. I will continue this trend and measure the potential at pH 8.

This was the experiment protocol that was done:

Add 6 mL of pH 8 buffer solution to the experiment beaker. Add 3 ml NaCl solution. Add 15 mL of water followed by 6 mL of quinone solution. Then measure the pH and run a CV scan. After the measurement, transfer the contents of the experiment beaker to the waste beaker.

This was the expected output from the experiment:

The measured pH should be around 8. The potential should be more negative than the previous measurement at pH 7.

This was the actual output from the experiment:

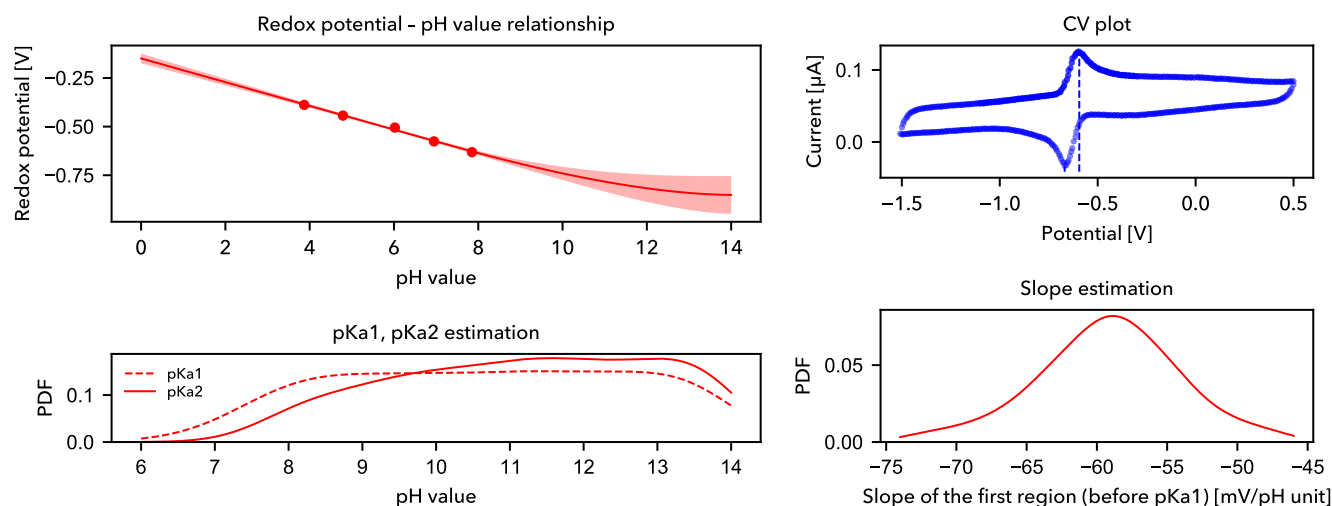
```
[{'pH': 3.87, 'eV': -0.3883181818181818}, {'pH': 4.79, 'eV': -0.4434841666666667},  
{ 'pH': 6.02, 'eV': -0.5049748251748252}, {'pH': 6.95, 'eV': -0.57605}, {'pH': 7.85,  
'eV': -0.6313348484848484}]
```

After performing the experiments, these are the results:

The estimate for pKa1 is 7.945.

The estimate for pKa2 is 17.386.

The estimate for slope is -60.958.



.....Log for experiment 6.....

This was the rationalization behind the experiment:

Based on the previous experiments, the potential became more negative as the pH increased. I will continue this trend and measure the potential at pH 9, which is the final pH level in the series.

This was the experiment protocol that was done:

Add 6 mL of pH 9 buffer solution to the experiment beaker. Add 3 ml NaCl solution. Add 15 mL of water followed by 6 mL of quinone solution. Then measure the pH and run a CV scan. After the measurement, transfer the contents of the experiment beaker to the waste beaker.

This was the expected output from the experiment:

Based on the trend observed in previous experiments, the measured pH should be around 9 (a little difference is okay) and the potential should be more negative than the previous measurement at pH 8.

This was the actual output from the experiment:

```
[{'pH': 3.87, 'eV': -0.3883181818181818}, {'pH': 4.79, 'eV': -0.4434841666666667},  
{ 'pH': 6.02, 'eV': -0.5049748251748252}, {'pH': 6.95, 'eV': -0.57605}, {'pH': 7.85,  
'eV': -0.6313348484848484}, {'pH': 9.13, 'eV': -0.6744594444444445}]
```

After performing the experiments, these are the results:

The estimate for pKa1 is 8.096.

The estimate for pKa2 is 12.380.

The estimate for slope is -60.958.

