analysis

May 13, 2023

1 Modules

```python
import pandas as pd
import matplotlib.pyplot as plt
```

2 Data

```python
acid_buffer = pd.read_csv("acid-buffer.txt")
base_buffer = pd.read_csv("base-buffer.txt")
pH = 2.92
V_acetic_acid = 10
V_NaOH = 10.2
pH_buffer_solution = 4.76
```
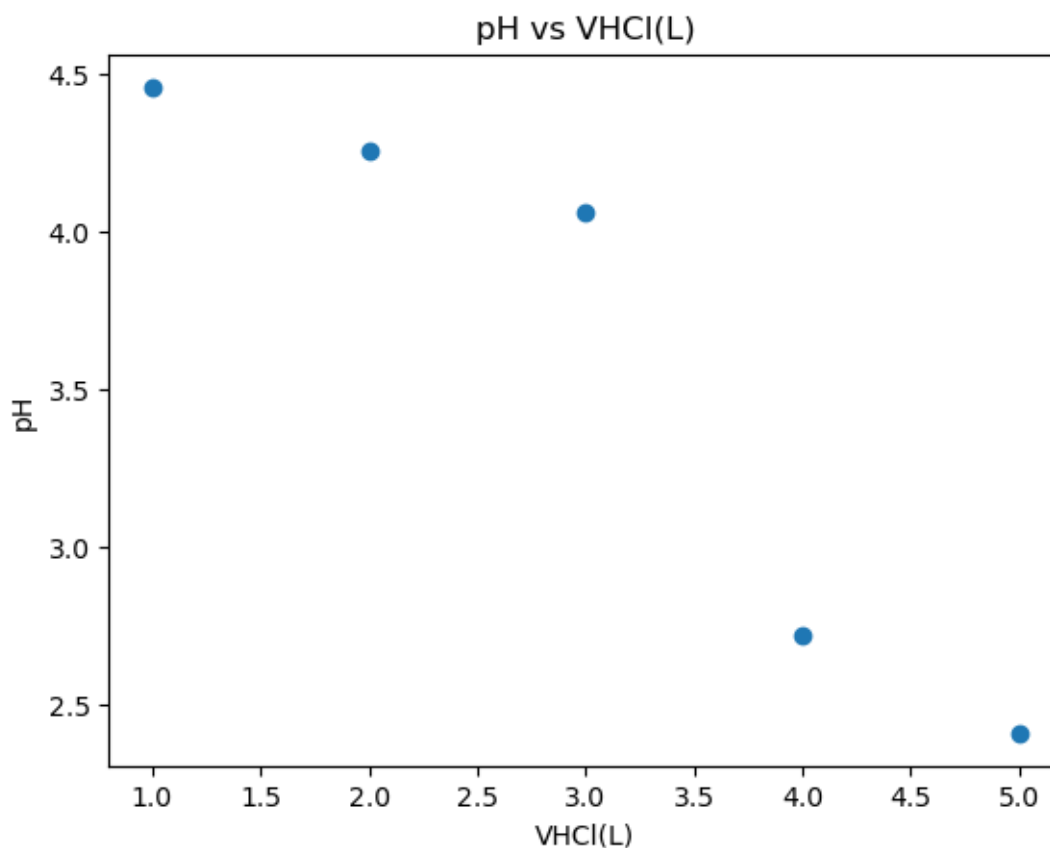
```python
acid_buffer
```

```
   VHCl(mL)    pH
0         1  4.46
1         2  4.26
2         3  4.06
3         4  2.72
4         5  2.41
```

```python
base_buffer
```

```
   VNaOH(mL)    pH
0          1  5.17
1          2  5.24
2          3  5.46
3          4  5.83
4          5  9.25
```
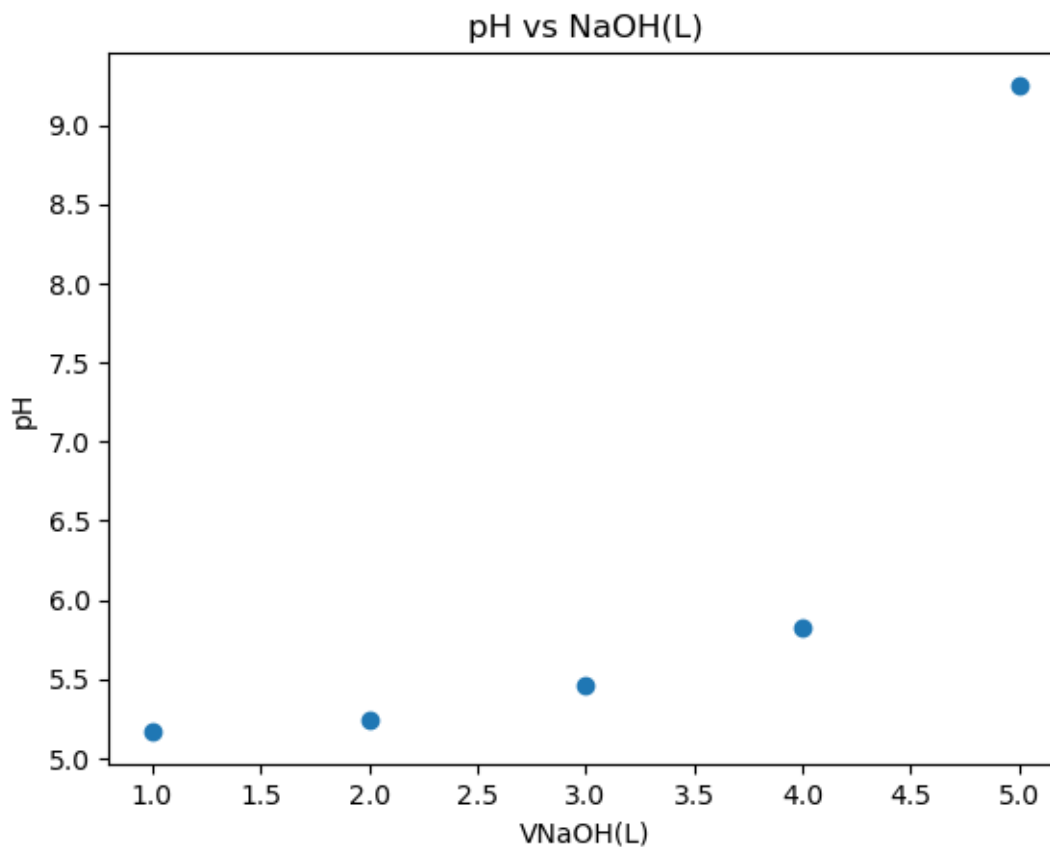
3 Buffer with a acid

```
fig,ax = plt.subplots()
ax.scatter(   acid_buffer["VHCl(mL)"] , acid_buffer["pH"]   )
ax.set_xlabel("VHCl(L)")
ax.set_ylabel("pH")
ax.set_title("pH vs VHCl(L)")
plt.show()
```


4 Buffer with a base

```
fig,ax = plt.subplots()
ax.scatter(   base_buffer["VNaOH(mL)"] , base_buffer["pH"]   )
ax.set_xlabel("VNaOH(L)")
ax.set_ylabel("pH")
ax.set_title("pH vs NaOH(L)")
plt.show()
```

pH vs NaOH(L)

5 K_a acetic acid

```
concetration_hydronium = round( 10**(  -pH ) , 5 )
M_acetic_acid = round( (V_NaOH*(1e-3)*0.1) / (V_acetic_acid*1e-3 ) -␣
 ↪concetration_hydronium, 3)
```

```
"The concentration of the acetic acid (not dissociated) is␣
 ↪"+str(M_acetic_acid)+"M"
```

[ ]: 'The concentration of the acetic acid (not dissociated) is 0.101M'

```
"The concentration of the hydronium ion is "+str(concetration_hydronium)+"M"
```

[ ]: 'The concentration of the hydronium ion is 0.0012M'

```
Ka = round( (concetration_hydronium**2 ) / (M_acetic_acid) , 7)
"Ka is " + str(Ka)
```

[ ]: 'Ka is 1.43e-05'