

# analysis

May 13, 2023

## 1 Modules

```
[ ]: import pandas as pd
```

## 2 Data

```
[ ]: KMNO4 = pd.read_csv("KMNO4.txt")
sodium_oxalate = pd.read_csv("sodium-oxalate.txt")
```

```
[ ]: KMNO4
```

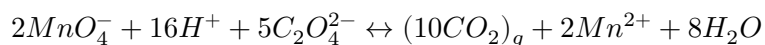
```
[ ]:      Na2C2O4(g)  KMNO4-0.1M(mL)
0          0.34          10.1
1          0.33           9.8
```

```
[ ]: sodium_oxalate
```

```
[ ]:      m(g)  KMNO4(mL)
0  0.34      6.3
1  0.33      6.3
```

## 3 Theory reaction of equation in acid medium

$KMnO_4$  with  $Na_2C_2O_4$  in a



```
[ ]: mols_potassium_permanganate = 0.1 * (10e-3)
mols_sodium_oxalate = mols_potassium_permanganate * (5/2)
mass_sodium_oxalate = mols_sodium_oxalate*134

"We need aproximate "+str(mass_sodium_oxalate) + "g of sodium oxalate"
```

```
[ ]: 'We need aproximate 0.335g of sodium oxalate'
```

## 4 Concetration of $MnO_4$

```
[ ]: mols_potassium_permanganate = (KMNO4["Na2C2O4(g)"] / 134) * (2/5)
M_potassium_permanganate = mols_potassium_permanganate / ( (KMNO4["KMNO4-0.
↪1M(mL)"] ) * 1e-3 )
N_potassium_permanganate = M_potassium_permanganate / 5

mean_M_potassium_permanganate = round( M_potassium_permanganate.mean() , 2)
mean_N_potassium_permanganate = round( N_potassium_permanganate.mean(), 3 )
std_M_potassium_permanganate = round( M_potassium_permanganate.std() , 5)
std_N_potassium_permanganate = round( N_potassium_permanganate.std(), 6 )

"The solution of potassium permangan has a concentration of ( "+str(
↪mean_M_potassium_permanganate )+" +- "+str(std_M_potassium_permanganate) + "
↪)M and a normality of (" +str( mean_N_potassium_permanganate )+" +- " +
↪str(std_N_potassium_permanganate) + ") N"

[ ]: 'The solution of potassium permangan has a concentration of ( 0.1 +- 2e-05 )M
and a normality of (0.02 +- 4e-06) N'
```

## 5 Purity sample of sodium oxalate

```
[ ]: mols_potassium_permanganate =
↪sodium_oxalate["KMNO4(mL)"] * 1e-3 * mean_M_potassium_permanganate
mols_sodium_oxalate = mols_potassium_permanganate * (5/2)
mass_sodium_oxalate = mols_sodium_oxalate * 134
concentration = ( mass_sodium_oxalate / sodium_oxalate["m(g)"] ) * 100
mean_concentration = round( concentration.mean() )
std_concentration = round( concentration.std() )

"The sample has a concetration of (" +str(mean_concentration)+" +-
↪"+str(std_concentration) + ")%"

[ ]: 'The sample has a concetration of (63 +- 1)%'
```