

7/27/2021

INVESTIGATING THE REACTION OF NICKEL WITH ETHYLENEDIAMINE

BACKGROUND:

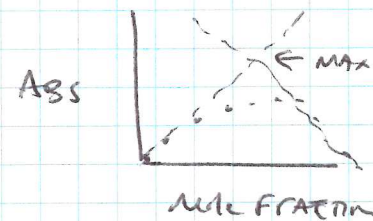
BEER-LAMBERT LAW $A = abc$

A = Absorbance

a = molar attenuation coefficient

b = Path Length (1 cm)

c = concentration in mol/L



$$\text{Mole Fraction} = \frac{n_i}{n_{\text{total}}} = \frac{\text{moles } i}{\text{moles total}}$$

$$\text{Abs corrected} = A_{\text{obs}} - (x_i) A_i$$

Pre-Lab

1. $a = 14600 \text{ L/mol}\cdot\text{cm}$ @ 452 nm

$$A = abc$$

$$1.50 = (14600 \frac{\text{L}}{\text{mol}\cdot\text{cm}})(1 \text{ cm}) c$$

$$c = 1.03 \times 10^{-4} \text{ mol/L}$$

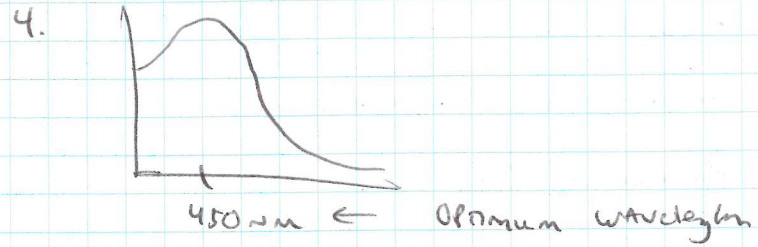
2. a. Water droplets would lower the measured Abs.
- b. Cuvette with more solution would make no difference.
- c. Wavelength not at max Abs. would lower measured Abs.
- d. Smoother fingerprint would lower measured Abs.

RWA

7/27/2011

Pre-Lab

3. You do not want higher concentration having carry-over + affecting your results.



5. Sample #1

$$A_{\text{corr}} = A_{\text{obs}} - (1 - x_{\text{scw}})A_{\text{Fe}} - (x_{\text{scw}})A_{\text{Cu}}$$

$$A_{\text{corr}} = (0.034) - (1 - 0.0)(0.034) - (1 - 0)(0.025) = -0.025$$

Sample #2

$$A_{\text{corr}} = (0.468) - (1 - 0.1)(0.034) - (1 - 0.1)(0.025) = 0.4149$$

Sample #4

$$A_{\text{corr}} = (\text{1.718})_{\substack{\text{PWA} \\ \text{7/27/2011}}} - (1 - 0.4)(0.034) - (1 - 0.4)(0.025) = 1.6826$$

Sample #5

$$A_{\text{corr}} = (1.668) - (1 - 0.6)(0.034) - (1 - 0.6)(0.025) = 1.6454$$

PWA

7/27/2011

Pre-Lab

Sample #6

$$A_{\text{corr}} = (0.906) - (1 - 0.8)(0.034) - (1 - 0.8)(0.025) = 0.8942$$

Sample #7

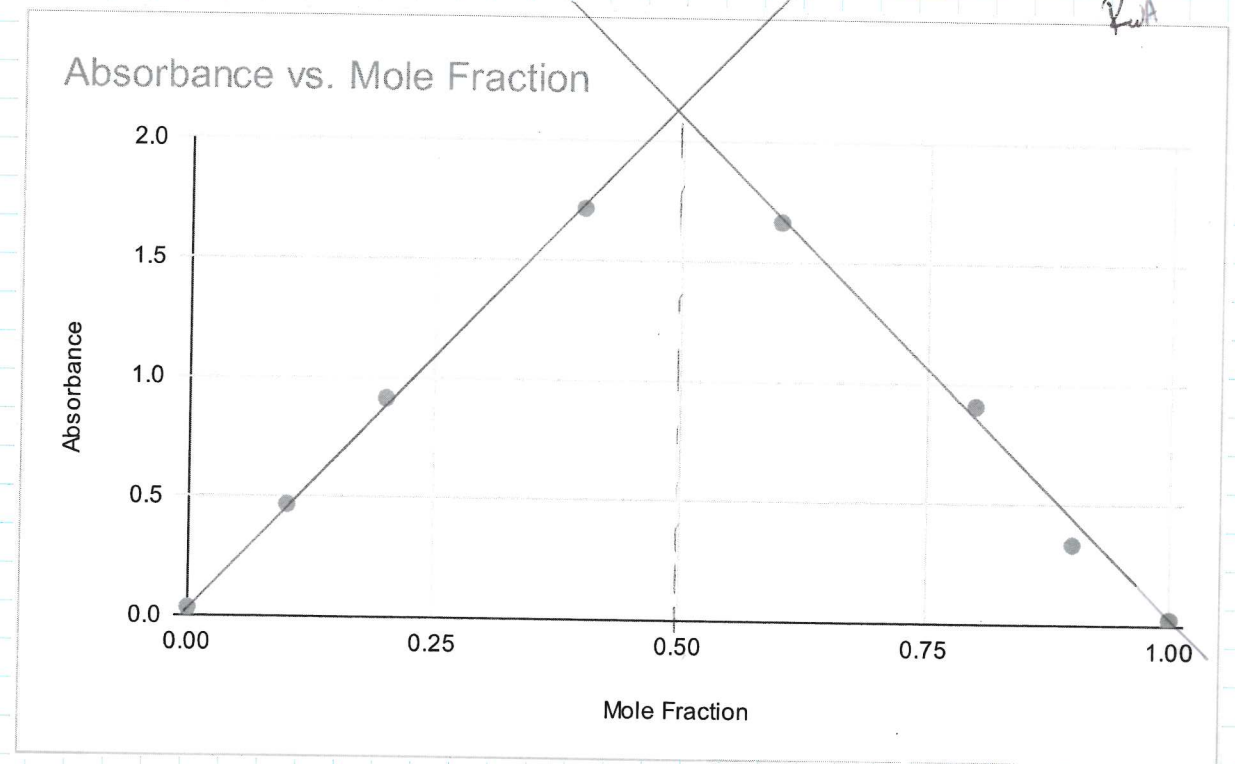
$$A_{\text{corr}} = (0.335) - (1 - 0.9)(0.034) - (1 - 0.9)(0.025) = 0.3291$$

Sample #8

$$A_{\text{corr}} = (0.025) - (1 - 1)(0.034) - (1 - 1)(0.025) = 0.025$$

~~#2 Mole Fraction from PWA 7/27/2011~~

#6

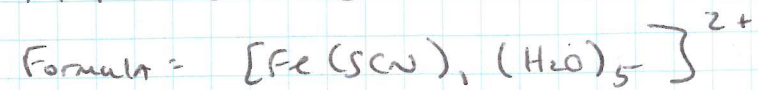


PWA

7/27/2021

#6 MAX ABS. AT WAVELENGTH 0.50

#7 1:1 ratio of $Fe^{+2} : SCN^{-}$

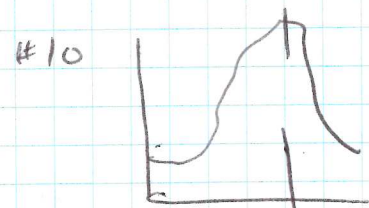


#8 $A = abc$

$1.669 = a(1cm)(2.5 \times 10^{-3} M)$

$a = 667.6$

#9 THAT WAVELENGTH IS A CLEAR LIMITING REAGENT.

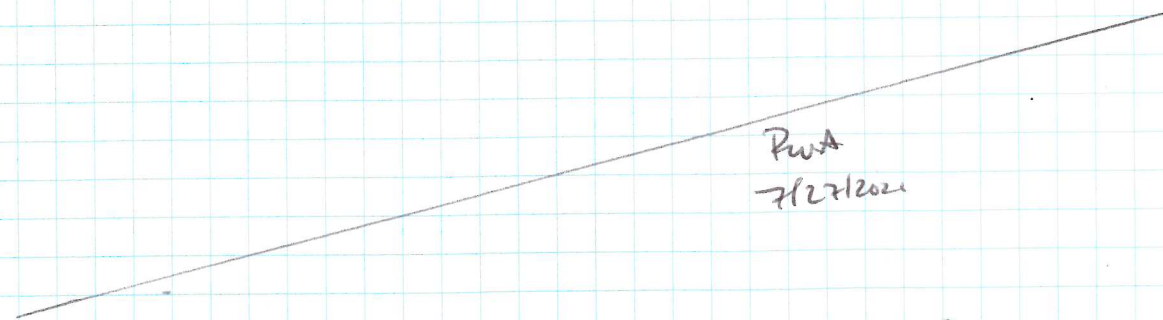


540nm ← max ABS.

#11

Sample #1	#2	#3	#4	#5	#6
vol of $NiSO_4(Ni^{+2})$	2.0	4.0	6.0	8.0	10.0
vol of EN	10.0	8.0	6.0	4.0	2.0

ABS



7/28/2021

Procedure

* Use GRADUATED CYLINDER TO MEASURE OUT VOLUMES OF

$Ni^{+2} = 0.5 Molar Nickel Sulfate$

EN = 0.5 Molar ETHYLENE DIAMINE SOLUTION

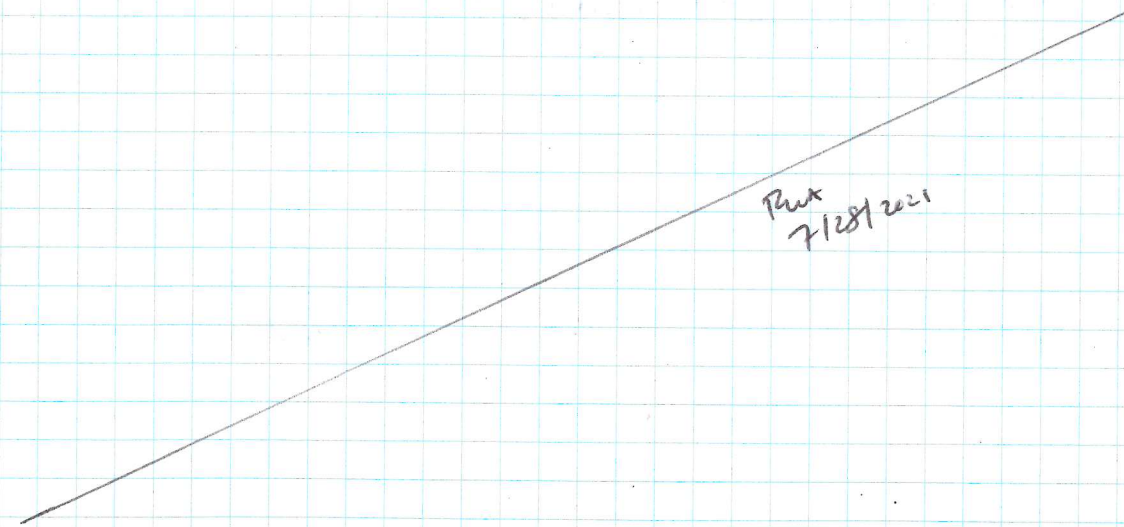
	#1	#2	#3	#4	#5	#6
Volume of Ni^{+2}	0.0	2.0	4.0	6.0	8.0	10.0
Volume of EN	10.0	8.0	6.0	4.0	2.0	0.0
Absorbance	0.000	0.434	0.694	0.485	0.310	0.165

* Measure Absorbance on colorimeter at 565nm

OBSERVATION Clear purple Darker purple Blue Tint Green

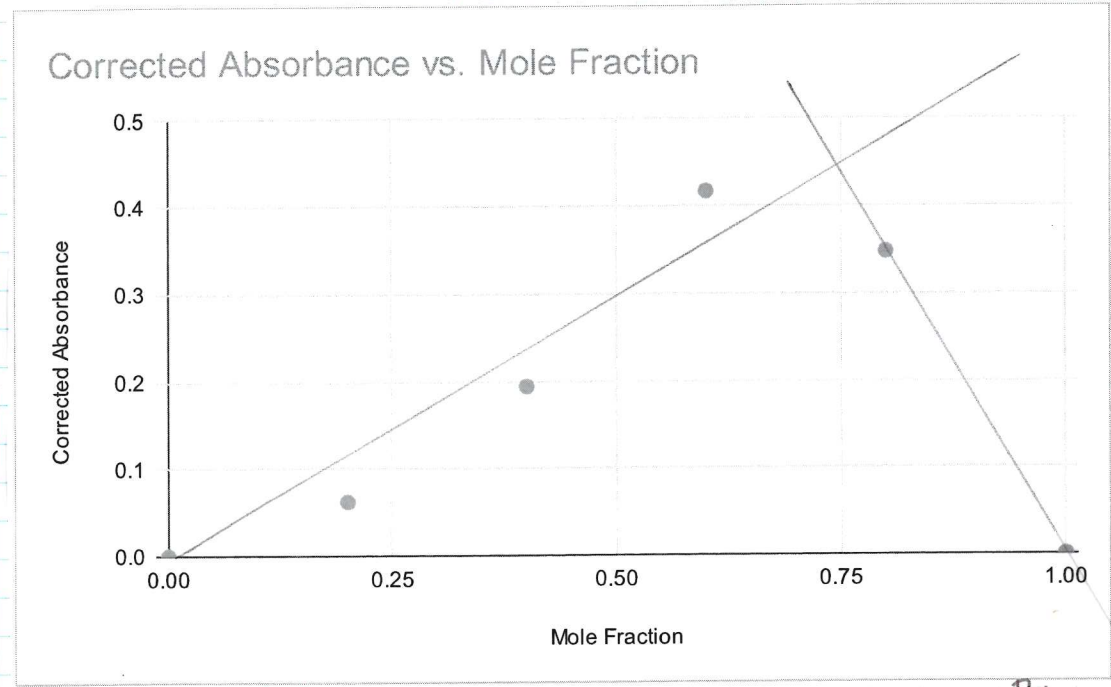
A _{corr}	0.000	0.3472	0.4164	0.194	0.062	0.000
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$A_{BC\ corr} = A_{obs} - (1 - X_{EN})A_0$



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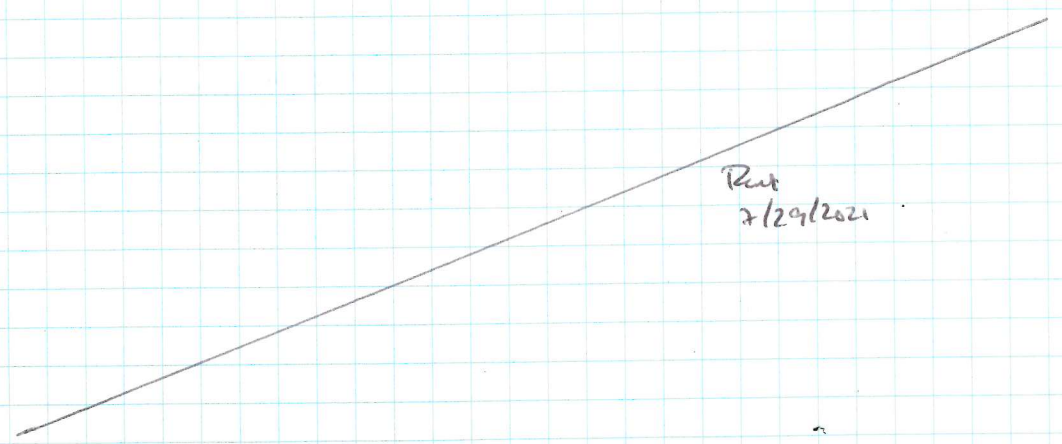
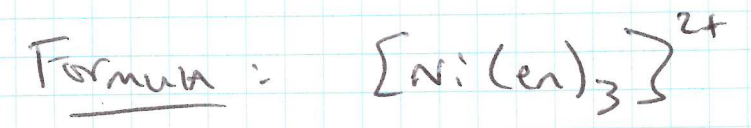
Plot: Corrected Abs. vs. Mole Fraction



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7/29/2021

$x_c = 0.75$

$En = 0.75$ 3
 $Ni^{2+} = 0.25$ 1 RATIO



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