

# [Stoichiometry of metal ligand complex - lab report example](https://assignbuster.com/stoichiometry-of-metal-ligand-complex-lab-report-example/)

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## Stoichiometry of metal ligand complex

Stoichiometry of metal ligand complex Objective: To determine the correct ligand-to-metal ratio using tissue culture plate and spectrophotometric methods.
Procedure
Into each of the five wells (A, B, C, D and E), 3 drops of hydroxylamine were added. 2 drops of 0. 02 M Fe(II ) solutions were then added to well A, 4 drops to well B, 6 drops to well C, 8 drops to well D and 10 drops to well E. The reverse order was followed in adding 0. 02 M of ferrozine.
The above procedure was repeated in the case of phenanthroline and terpyridine ligands.
Results
Table 1: Concentrations of Stock Solutions
Compound
Concentration, g/L
Concentration, M
iron (II)
1. 000
0. 020
Ferrozine
1. 000
0. 002
terpyridine
0. 500
0. 002
phenanthroline
1. 000
0. 006
Table 2: Data from Spectrophotometric Analysis
Ferrozine
Solution
Volume of Iron (II) in cuvette, mL
[Iron (II)], M
Volume Ferrozine in cuvette, mL
[Ferrozine], M
Absorbance
A
0. 270
0. 150
1. 330
0. 0030
0. 4140
B
0. 530
0. 075
1. 070
0. 0037
0. 4100
C
0. 800
0. 050
0. 800
0. 0050
0. 3960
D
1. 070
0. 037
0. 530
0. 0075
0. 4320
E
1. 330
0. 030
0. 270
0. 0150
0. 4160
F

Terpyridine
Solution
Volume of Iron (II), mL
[Iron (II)], M
Volume terpyridine, mL
[terpyridine], M
Absorbance
A

. 195
B

. 290
C

. 400
D

. 535
E

. 516
F

Phenanthroline
Solution
Volume of Iron (II) in cuvette, mL
[Iron (II)], M
Volume phenanthroline in cuvette, mL
[phenanthroline], M
Absorbance
A
0. 267
0. 015
0. 137
0. 0900
0. 0250
B
0. 533
0. 075
1. 067
0. 0110
-0. 0830
C
0. 800
0. 050
0. 800
0. 0150
0. 0480
D
1. 067
0. 037
0. 533
0. 0230
-0. 0554
E
0. 133
0. 030
0. 267
0. 0450
0. 0976
F

Figure 1: A graph of wells as a function of no. of drops for Ferrozine
Figure 2: A graph of wells as a function of no. of drops for Phenanthroline
Figure 3: A graph of volume of metal solution versus absorbance for Ferrozine
Figure 4: A graph of volume of metal solution versus absorbance for phenathroline
Discussion
From the concentration of Phenanthroline and iron, moles of Fe in the complex = 0. 00004 while those of Phenanthroline = 0. 00008, therefore mole ratio is 1: 2 therefore n value is 2. The experimental n value for Phenanthroline in Fe (II) is 2 while that of ferrozine is 3(Amaal et al, 2008). The experimental n values agree with the values predicted by the sructures of the ligand.
Works cited
Amaal Y. Assaf , Jassim M. Alyass , Abeer S. Mohammed. (2008). Synthesis and characterization of Fe(II), Co(II), Ni(II), Cu(II) and Zn(II)complexes with mixed ligands of α-naphthylamine dithiocarbamate and 1, 10-phenanthroline. Department of Chemistry, College of Education, Mosul University , Mosul , Iraq.