

# [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.