**Abstract**

The thesis have been covered synthesis seven Azo ligands, the coupled reaction of 4,5-Diphenyl imidazol with Diazonium salts of some Aniline derivatives with various substituents such as (Aniline, 4-Nitro aniline, 3-Nitro aniline, 2-Nitro aniline, 4-Methyl aniline, 3-Methyl aniline, and 2-Methyl aniline), the varity of substituents shows the effect of induced group and with drawing group as well as the position on the ring.

The prepared compounds was characterized by the spectroscopic methods [FTIR, Uv-Vis. and micro analysis of elements C.H.N], where as complexes of these ligands was prepared with divalent Nickel ion with condition control of reaction's media, time, and temperature.

The stoichometry of complexed was measured by mole ratio method [Metal : Ligand] by Uv-Vis. Spectroscopy, the result studies displayed the mole ratio is 1:1 for all complexes while the prepared complexes was characterized by the spectroscopic methods, atomic absorption, molar conductivity, and magnetic susceptibility. From these studies the suggest geometry around the Nickel (II)ion is square planer.



**R = H, p-NO2, m-NO2, o–NO2, p–CH3, m–CH3, and o–CH3**

The supported studies of magnetic measurements appears the diamagnetic property of all complexes and the C.H.N result shows the corresponding between the actual and calculated values.

The studies included the determination of stability constant in the thermal range (0-50 oC), the study illustrated the dependence of stability constant upon the induced effect of substitution group, size and it is position according of Azo group, the effect of temperature, ∆S, ∆H, ∆G values was studied.