



**Ain Shams University**  
**Faculty of Science**  
**Chemistry Department**

# **Preparation and Characterization of Some Group 8B Salen Complexes and Their Application in Chemical Sensors**

**Thesis submitted for the degree of master  
In  
Inorganic and analytical chemistry**

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To

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وَقُلْ لِّعِبَادِي

فَسِيْرُوا لِي عَزَائِكُمْ وَرُسُوْلُهُ وَالْمُؤْمِنُوْنَ

# *Dedication*

To my first tutor ever, to my Mom, my inspiration and my continuous support

To the one who taught me to be whom I am, my late Grandmother, may Allah bless her soul

To my biggest support system ever, my Dad

To my late aunt, who was always a guide and a support, may Allah bless your kind soul

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**Mohammed Hammam Mohammed**

## *List of abbreviations*

<b><math>K_{ij}^{\text{Pot}}</math></b>	<i>Potentiometric selectivity coefficient</i>
<b><math>\Lambda_m</math></b>	<i>molar conductivity</i>
<b>CHN</b>	<i>elemental analyses</i>
<b>DL</b>	<i>Detection limit</i>
<b>DMF</b>	<i>Dimethyl formamide</i>
<b>DMSO</b>	<i>Dimethyl sulphoxide</i>
<b>DOS</b>	<i>Diocetyl sebacate</i>
<b><math>E_{\text{ext.ref}}</math></b>	<i>The potential of external reference electrode</i>
<b><math>E_{\text{int.ref}}</math></b>	<i>The potential of internal reference electrode</i>
<b><math>E_j</math></b>	<i>The liquid junction potential</i>
<b><math>E_M</math></b>	<i>The membrane potential</i>
<b>EMF</b>	<i>Electromotive force</i>
<b>ESR</b>	<i>Electron Spin Resonance</i>
<b>FIM</b>	<i>Fixed interference method</i>
<b>FT-IR</b>	<i>Fourier transform infrared spectroscopy</i>
<b>ISE</b>	<i>Ion selective electrode</i>
<b>ISFET</b>	<i>Ion selective field effect transistor</i>

<b>IUPAC</b>	<i>International Union of Pure and Applied Chemistry</i>
<b>KTFPB</b>	<i>potassium tetrakis[bis(3,5-trifluoromethyl)phenyl] borate</i>
<b>LMCT</b>	<i>Ligand Metal charge transfer</i>
<b>M</b>	<i>Molarity or metal ion</i>
<b>MLCT</b>	<i>Metal ligand charge transfer</i>
<b>MPM</b>	<i>Matched potential method</i>
<b>nm</b>	<i>nanometer</i>
<b>NMR</b>	<i>Nuclear Magnetic Resonance</i>
<b>°C</b>	<i>degree Celsius</i>
<b><i>o</i>-NPOE</b>	<i>2-nitrophenyl octyl ether</i>
<b>PU</b>	<i>Polyurethane</i>
<b>PVC</b>	<i>Poly vinyl Chloride</i>
<b>SB</b>	<i>Schiff base</i>
<b>SSM</b>	<i>Separate solution method</i>
<b>TDMAC</b>	<i>Tridodecyl methyl ammonium chloride</i>
<b>TGA</b>	<i>Thermogravimetric analysis</i>
<b>THF</b>	<i>Tetrahydrofuran</i>
<b>TLC</b>	<i>Thin layer chromatography</i>
<b>UV-VIS</b>	<i>Ultra violet-Visible spectroscopy</i>

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