



**Faculty of Science  
Chemistry Department**

# **FORMULATION OF NEW MODIFIED ALKYD RESINS AND THEIR APPLICATION IN THE FIELD OF SURFACE COATINGS**

**A Thesis**

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fulfillment for requirements of the master of Science**

**By**

**Mohamedy El Sayed Abd El Hady**

**Supervisors**

**Prof. Dr. Alyaa Abou sheaishaa Shalaby**

**Prof. Dr. Farag Abd El Hai Ahmed**

**Dr. Manal Mohamed El-Shahawi**

# **APPROVAL SHEET FOR SUBMISSION**

**Title of M.Sc. Thesis:**

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**Name of the candidate:**

**Mohamedy El Sayed Abd El Hady**

**The Supervisors have approved this thesis for submission:**

**Thesis Advisors:**

**Approved**

**Prof. Dr. Alyaa Abou sheaishaa Shalaby**

Professor of Organic Chemistry  
Department of Chemistry  
Faculty of Science, Ain Shams University

**Prof .Dr. Farag Abd El Hai Ahmed**

Professor of Applied Chemistry  
Department of Chemistry  
Faculty of Science, Al-Azhar University

**Dr. Manal Mohamed El-Shahawi**

Assistant Professor of Organic Chemistry  
Department of Chemistry  
Faculty of Science, Ain Shams University

**Head of Chemistry Department**

**Prof. Dr. Ibrahim H. A. Badr**

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## List of Abbreviations

<b>a</b>	Air dried film
<b>A.V.</b>	Acid value
<b>AA2024-T3</b>	Type of Aluminum alloy
<b>AC</b>	Acrylic resin
<b>AFM</b>	atomic force microscopy
<b>AR</b>	Alkyd resin
<b>ASTM</b>	American Society for Testing and Materials specification
<b>ATR-FTIR</b>	Attenuated total reflection in conjunction with infrared spectroscopy
<b>AV</b>	Acid value
<b>AZ31B</b>	Type of magnesium alloy
<b>b.p.</b>	Boiling point
<b>BPO</b>	Benzoyl peroxide
<b>BTA</b>	Benzotriazole
<b>BTESPT</b>	Bis-[triethoxysilylpropyl]tetrasulfide
<b>BTSA</b>	2-benzothiazolythio-succinic acid
<b>BZ</b>	Benzoate
<b>C<sub>c</sub></b>	Coating capacitance,
<b>Ce(dbp)<sub>3</sub></b>	Cerium dibutyl phosphate
<b>CHVE</b>	Cyclohexyl vinyl ether
<b>CNTs</b>	Carbon nano-tubes
<b><sup>13</sup>C NMR</b>	<sup>13</sup> C nuclear magnetic resonance
<b>DEA</b>	Diethanolamine
<b>DFT</b>	Dry film thickness
<b>DIN</b>	German Institute for Standardization ( <b>D</b> eutsches <b>I</b> nstitut für <b>N</b> ormung)
<b>DLS</b>	Dynamic light scattering
<b>DMA</b>	Dynamic mechanical analysis
<b>D<sub>p</sub></b>	Degree of polymerization
<b>DSC</b>	Differential scanning calorimetry
<b>e<sub>0</sub></b>	Total equivalents percent at start of reaction

<b>Continued List of abbreviations</b>	
<b>e<sub>A</sub></b>	Total number of acid and anhydride equivalents
<b>e<sub>B</sub></b>	Total number of hydroxyl equivalents
<b>EB</b>	Electron beam
<b>E<sub>corr</sub></b>	Corrosion potential
<b>EDX</b>	Energy-dispersive X-ray spectroscopy
<b>EIS</b>	Electrochemical impedance spectroscopy
<b>EN</b>	European standardization
<b>Eq.w.</b>	Equivalent weight
<b>Ex</b>	Excellent (almost no film defect)
<b>F</b>	Functionality
<b>F</b>	Fair (partially attacked)
<b>FAME</b>	Fatty acid methyl esters
<b>FESEM</b>	Field emission scanning electron microscope
<b>FTIR</b>	Fourier transform infrared spectroscopy
<b>G</b>	Glycerin
<b>G</b>	Good (very slight attack)
<b>GC–MS</b>	Gas chromatography–mass spectrometry
<b>GNPs</b>	Graphene nano-platelets
<b>GO</b>	Graphene oxide nanosheets
<b>GPC</b>	Gel permeation chromatography
<b>GPEr</b>	Hydroxyl oligomers
<b>GPTMS</b>	(3-glycidoxypopyl)methyldiethoxysilane
<b>h</b>	Hour(s)
<b><sup>1</sup>H NMR</b>	Proton nuclear magnetic resonance
<b>H<sub>2</sub>O off</b>	Water millimeters at which the reaction will be completed
<b>HAP</b>	Hazardous air pollutants
<b>HBAs</b>	Hyperbranched alkyd resins
<b>HBP</b>	Hyperbranched polyester polyol of fourth generation
<b>HD</b>	Hard dry
<b>HEFCA</b>	N,N-bis(2-hydroxyethyl)furan-2-carboxamide <b>4</b>
<b>HETCA</b>	N,N-bis(2-hydroxyethyl)thiophene-2-carboxamide <b>3</b>