



Synthesis of Nanocomposites based on Poly (ionic liquid) for Different Applications in Water Treatment and Petroleum Industry

Thesis submitted by

AbdelRahman Osama Ezzat AbdelRahman

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Under the supervision of

Prof. Dr. Ahmed Ismail Hashem

Full-time Prof. of Organic Chemistry, Faculty of Science, Ain Shams University

Prof. Dr. Ayman Mohamady Atta

Chemistry Department, Faculty of Science, King Saud University

Prof. Dr. Yasser Mohamed Mostafa

Director of the Egyptian Petroleum Research Institute

To

Department of Chemistry,

Faculty of Science, Ain Shams University

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Approval Sheet

Name of Candidate: AbdelRahman Osama Ezzat AbdelRahman

Degree: Ph.D. Chemistry

Thesis Title: Synthesis of Nanocomposites based on Poly (ionic liquid) for Different Applications in Water Treatment and Petroleum Industry

Thesis Supervisors

1. Prof. Dr. Ahmed Ismail Hashem

Full-time Prof. of Organic Chemistry, Faculty of Science, Ain Shams University

Thesis approval

A. I. Hashem

2. Prof. Dr. Ayman Mohamady Atta

Prof. of Polymer Chemistry, Faculty of Science, King Saud University

Ayman

3. Prof. Dr. Yaser Mohamed Mahmoud Moustafa

Research Prof., Director of the Egyptian Petroleum Research Institute

Yaser

Approval

Prof. Dr. Ayman Ayoub Abdel-Shafi

Chairman of Chemistry Department

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List of abbreviations

Abbreviation	Meaning
AA	Acrylic Acid
AbA	Abietic acid
ACVA	4,4'-Azobis(4-cyanovaleric acid)
AIBN	Azo-bis isobutyronitrile
Ag NPs	Silver nanoparticles
AAM	Acrylamide
AAT	Amonium acrylate
A _{min}	Minimum area
AMPS	2-Acrylamido-2-methyl-1-propanesulfonic acid
AMIMCl	1-Allyl-3-methyl imidazolium chloride
AMIMO	1-Allyl-3-methylimidazolium oleate
AMIMA	1-Allyl-3-methylimidazolium abietate
AMIMCO	Cardanol 1-allyl-3-methylimidazolium salt
AMPSA	Ammonium 2-acrylamido-2-methylpropane-1-sulfonate
APS	Ammonium persulfate
BET	Brunauer Emmett Teller
[BMIM]Br	1-Butyl-3-methylimidazolium bromide
cac	Critical aggregation concentration
CR	Congo red dye
¹³ CNMR	Carbon-13 nuclear magnetic resonance
[CbMIM][Cl]	3-(2-carboxybenzoyl)-1-methyl-1H-imidazol-3-ium chloride
[C=C2C1im]Cl	1-Allyl-3-methylimidazolium chloride
[C4C1im]Cl	1-Butyl-3-methylimidazolium chloride
[C4py][TF ₂ N]	1-Butylpyridinium bis(trifluoromethane)sulfonimide
DA	Dodecyl amine
DCDE	Dichlorodiethyl ether
DCM	Dichloromethane

DDI	1,3-Didodecyl-2-(4-hydroxyphenyl)-1H-imidazol-3-ium acetate
DEA	Diethanolamine
DEEA	Diethyl ethanolamine
Dh	Hydrodynamic diameter
DLS	Dynamic light scattering
DSC	Differential scanning calorimetry
DTG	Derivative thermogravimetry
DECA	Di-etherified cardanoxy amine
EA	Ethanolamine
ECH	Epichlorohydrin
EDHI	Ethoxylated diheptyl imidazolium acetate
EDDI	Ethoxylated didodecyl imidazolium acetate
Fe ₃ O ₄ NPs	Magnetite nanoparticles
FTIR	Fourier-transform infrared spectroscopy
GA	Glyoxal monohydrate
GO	Graphene oxide
HA	Heptyl amine
HAEMA	(Hydroxyethyl) methacrylate
HBA	p-Hydroxyl benzaldehyde
HBF ₄	Tetrafluoroboric acid
Hc	Coercively
HLB	Hydrophile-lipophile balance
[HMIM]Cl	1-Hexyl-3-methylimidazolium chloride
¹ HNMR	Proton nuclear magnetic resonance
HPF ₆	Hexafluorophosphoric acid
IFT	Interfacial tension
IL	Ionic liquid
MB	Methylene blue dye
MBA	N,N'-Methylene bisacrylamide
MILs	Monomeric ionic liquids
mim	Methyl imidazolium
MOR	magnetite to oil ratios

Mr	Remnant magnetization
Ms	Saturation magnetization
OA	Oleic acid
PAMPSA	Ammonium poly 2-acrylamido-2-methylpropane-1-sulfonate
PAMPS/AN	Poly 2-acrylamido-2-methylpropane-1-sulfonic acid co-poly acrylonitrile
PAMPSA/VP	Ammonium poly 2-acrylamido-2-methylpropane-1-sulfonate/ poly vinyl pyrrolidone copolymer
PDI	Polydispersity index
PDVB-IL	Poly divinylbenzene IL
PIL	PolyIonic liquid
PNIPAM	Poly(N,N-isopropyl acrylamide)
PTPSS	Poly(4-tetrabutylphosphonium styrene sulfonate)
PVP	Polyvinyl pyrrolidone
QDECA	Quaternized di-etherified cardanoxy amine
QTECA	Quaternized tri-etherified cardanoxy amine
RTILs	Room temperature ionic liquids
RSN	Relative solubility number
SEM	Scanning electron microscope
TEA	Triethanolamine
TECA	Tri-etherified cardanoxy amine
TEG	Tetraethylene glycol
TEM	Transmission electron microscopy
TEMED	Tetramethylethylenediamine
TFO or OTF	Trifluoromethanesulfonate anion
TFSI or TF ₂ N	Bis(trifluoromethane)sulfonimide
THPC	Trihexyl tetradecylphosphonium chloride
THPD	Trihexyl tetradecylphosphonium decanoate
THPDc	Trihexyl tetradecylphosphonium dicyanamide

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