Ain Shams University
Faculty of Science
Department of Chemistry

"Preparation and Characterization of Some Cationic Surfactants Capped Metal Nanoparticles and Their Applications"

A Thesis Submitted for Degree of Ph.D. in Organic Chemistry
To Department of Chemistry – Faculty of Science
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By

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Samy Mohamed Ahmed Ibrahim Shabaan

إهـــــداء

أهدي هذه الرسالة إلى روح والدي رحمه الله
وأسأل الله العظيم أن يتغمده بواسع رحماته
وإلـى أمـى الحبيبة
وإلـى زوجتى

CONTENTS

List of Abbreviation

Symol.	Abbreviation Name	Unit
γ	Surface Tension	mN/m^{-1}
CMC	Critical Micelle Concentration	mM/L
Γ_{max}	Maximum Surface Excess	$mol.cm^{-2}$
A_{min}	Minimum Surface Area	A^2
π_{CMC}	Effectiveness	mNm^{-1}
PC_{20}	Efficiency	------
ΔG^o_{mic}	Change free energy of micellization	Kj mol^{-1}
ΔG^o_{ads}	Change free energy of adsorption	Kj mol^{-1}
ΔH_{mic}	Change in enthalpies of micellization	Kj mol^{-1}
ΔH_{ads}	Change in enthalpies of adsorption	Kj mol^{-1}
ΔS_{mic}	Change in entropy of micellization	Kj $mol^{-1}K^{-1}$
ΔS_{ads}	Change in entropy of adsorption	Kj $mol^{-1}K^{-1}$
CR	Corrosion rate of carbon steel	$mg/cm^2.h$
W	weight loss	mg
S	Area of mild steel species	Cm^2
t	time of immersion	hrs
I_{Corr}	Corrosion current densities	mA cm^{-2}
β_a	Anodic Tafel slope	mV dec^{-1}
β_c	Cathodic Tafel slope	mV dec^{-1}
E_{corr}	Corrosion potential	mV

R_s	Solution resistance	ohm cm^2
R_{ct}	Charge transfer resistance	ohm cm^2
C_{dl}	Double layer capacitance	$\mu F\ cm^{-2}$
Z''_{img}	Frequency at maximum imaginary component	Hz
E_a	Activation Energy	kJ mol^{-1}
ΔH^*	The change in enthalpy of activation	kJ mol^{-1}
ΔS^*	The change in entropy of activation	J mol^{-1} K^{-1}
Θ	Surface coverage	----------
η	Efficiency of inhibition	----------
TEM	Transmission Electron Microscope	----------
DLS	Dynamic Light Scattering	----------
EDX	Energy Dispersive X-ray spectroscopy	----------
EIS	Electrochemical impedance spectroscopy	----------
SRB	Sulfate reducing Bacteria	----------
AgNPs	Silver Nanoparticles	----------

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