



**Faculty of Science  
Chemistry Department**

**Preparation of some thiol amine surfactants for sensors  
fabrication to determine the metal ions in polluted  
water**

**A Thesis**

**Submitted as Partial Fulfillment for Requirements of  
Master of Science  
"Chemistry Department"**

**By**

**Menna tallah Hesham Fathy Aly Bassiouny El-badry**

**(B.Sc. 2010)**

**Faculty of Science  
Ain Shams University  
Cairo, Egypt  
2016**



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**Menna tallah Hesham Fathy Aly Bassiouny  
El badry**

Under The Supervision of:

**Prof. Dr. Ahmed Ismail Hashem**  
Professor of Organic Chemistry  
Faculty of Science - Ain Shams University

**Prof. Dr. Ahmed Mohamed Al-Sabagh**  
Professor of Applied Chemistry – Director of Egyptian  
Petroleum Research Institute

**Dr. Tamer Awad El-Sayed Ali**  
Researcher - Egyptian Petroleum Research Institute

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**Presented by**

**Menna tallah Hesham Fathy Aly Bassiouny  
El badry  
(B.Sc. 2010)**

**Thesis Advisors**

**Prof. Dr. Ahmed I. Hashem**  
Faculty of Science, Ain Shams University.

**Prof. Dr. Ahmed Mohamed Al-Sabagh**  
Director of Egyptian Petroleum Research Institute

**Dr. Tamer Awad El-Sayed Ali**  
Egyptian Petroleum Research Institute

**Thesis Approved**

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**Head of Chemistry Department  
Prof. Dr. Ibrahim Hussieny Ali Badr**

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**Menna tallah Hesham Fathy**

# *Dedication*

*I lovingly dedicate this work to my Family. First, to my respective Father who has been my constant source of inspiration. He gave me the drive and discipline to tackle any task with enthusiasm and determination. Secondly, to my sincere husband without his love and support my success would not have been made possible. Next, to my mother and siblings. Last, to my encouraging friends, especially to Alaa zidan who has always been a great mentor to me, Mona elrayes and Tahany Mahmoud, thanks for your guidance and advice. I love you all.*

## LIST OF ABBREVIATIONS

$A_{\min}$	Minimum surface area per molecule
AAS	Atomic absorption spectrometry
AIBN	Azobisisobutyronitrile
CMC	Critical micelle concentration
CPEs	Carbon paste electrodes
CWE	Coated wire electrode
CWISE	Coated wire ion selective electrodes
DBP	Dibutylphthalate
DOP	Diethylphthalate
DOS	Diethylsebacate
FIA	Flow injection analysis systems
FIM	Fixed interference method
FPM	Fixed primary ion method
FTIR	Infrared spectroscopy
GPC	Gel permeation Chromatography
ISE	Ion selective electrodes
MCPE	Modified carbon paste electrode
MPM	Matched potential method
PVC	Polyvinyl chloride
R	Universal constant
RE	Reference electrode
RSD	Relative standard deviation
SPEs	Screen printed electrodes
SSM	Separate solution method
THF	Tetrahydrofuran
TPB	Tetraphenylborate
TSM	Two solution method

$\pi_{\text{CMC}}$	Effectiveness
$E^{\circ}$ cell	Standard cell potentials
<i>o</i> -NPOE	<i>o</i> -Nitrophenyl octyl ether
TCP	Tricresylphosphate
$\Gamma_{\text{max}}$	Surface excess concentration

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## **Aim of the work**

This thesis mainly aims to prepare some aminothiolsurfactants such as, poly-3-(hexadecylthio)-N-hexadecylacrylamide, poly-3-(dodecylthio)-N-hexadecylacrylamide, poly-3-(hexadecylthio)-N,N-bis(2-hydroxyethyl)acrylamide, Poly-3-(dodecylthio)-N,N-bis(2-hydroxyethyl)acrylamide, (Z)-3-(hexadecylthio)-N,N-bis(2-hydroxyethyl)acrylamide, (Z)-3-(dodecylthio)-N,N-bis(2-hydroxyethyl)acrylamide, poly-3-(hexadecylthio)-N-dodecylacrylamide, poly-3-(dodecylthio)-N-dodecylacrylamide. After the preparation, their structures were confirmed by different methods. The first and second of the prepared compounds were used as ionophores to prepare modified carbon paste electrode. It was hoped to propose sensitive, accurate and reproducible electroanalytical method of analysis that can be used for the determination of chromium(III) ions in tap water, river water and formation water samples. The work has focused on the following: Testing the performance of the modified CPEs for the potentiometric determination of Cr(III) in tap water, river water and formation water samples. The performance of such

sensors in the potentiometric determination of Cr(III) ions compared with the atomic absorption spectrometric method.