Novel chemical sensors for some ionic species based on Nanocomposite polymeric membranes

A Thesis

Submitted to Chemistry Department Faculty of Science – Ain Shams University in Partial Fulfillment for Requirements of the Master Degree of Science (M.Sc) in Chemistry

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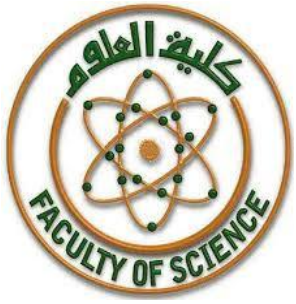
قال الله تعالى :

﴿ يَرْفَعِ ٱللَّهُ ٱلَّذِينَ ءَامَنُوا۟ مِنكُمْ وَٱلَّذِينَ أُوتُوا۟ ٱلْعِلْمَ دَرَجَٰتٍ ۚ وَٱللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ ﴿١١﴾ ﴾

سورة المجادلة

يرفع الله مكانة المؤمنين المخلصين منكم، ويرفع مكانة أهل العلم درجات كثيرة في الثواب ومراتب الرضوان, والله تعالى خبير بأعمالكم لا يخفى عليه شيء منها, وهو مجازيكم عليها. وفي الآية تنويه بمكانة العلماء وفضلهم، ورفع درجاتهم.

(التفسير الميسر)



Dedication

I do appreciate Allah for giving me great parents who are enlightening my way and always supporting me in all my life even when I lost my way they were beside me,
Never give up on me.
To my friends who give me the full support. I also thank everyone who had faith in me and never doubt that I will reach my goal

ACKNOWLEDGEMENT

I would like to express my sincere gratitude and indebted to **Prof. Dr. Ibrahim H. A. Badr,** Prof. of Analytical Chemistry, Chemistry Department, Faculty of Science, Ain Shams University, and **Prof. Dr. Hamdy H. Hassan**, Prof. of Physical Chemistry, Chemistry department, Faculty of Science, Ain Shams University. They were always kind enough to suggest the topics of research and to follow up the progress of this work with keen interest, guidance and valuable criticism and their efforts made this humble work as possible.

Also, I wish to express my sincere gratitude to **Dr. Eman Hamed**, Assistant Professor of Inorganic Chemistry, Chemistry Department, Faculty of Science, Ain Shams University, for her valuable advice and encouragement during this research work.

Abbreviations

A	Surface area
AA	ascorbic acid
AFM	Atomic force microscopy
CMEs	Chemically modified electrodes
CuNPs	Copper nanoparticles
CV	Cyclic voltammetry
CVD	Chemical vapor deposition
D	Diffusion coefficient
DA	dopamine
DP	Deposition potential
DPV	Differential pulse voltammetry
EDX	Energy dispersive X-ray spectroscopy
Ep	Anodic peak potential
GCE	Glassy carbon electrode
GE	graphite electrode
Ip	Anodic peak current
LOD	Lower limit of detection
LSV	Linear sweep voltammetry
MWCNT	Multi wall carbon nanotube

N	Number of cycles
NPs	Nanoparticles
n_{α}	Number of electrons in rate-determining step
PPm	Part per millions
RE	Reference electrode
R.S.D	Relative standard deviation
SAM	Self-assembled-monolayers
SEM	Scanning electron microscopy
SPCEs	Screen-printed carbon electrodes
STM	Scanning tunneling microscopy
SWCNT	Single wall carbon nanotube
TEM	Transmission electron microscopy
WE	Working electrode
XPS	X-ray photoelectron spectroscopy
XRD	X-ray diffraction spectroscopy
α	Electron transfer coefficient
v	Scan rate
Ni	Nickel

List of contents