بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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MONA MAGHRABY

Preparation and Characterization of Water Base Co-Polymer Nano Particles and Use it as a Binder for Printing Ink

A THESIS SUBMITTED

BY

MOHAMED GOMAA HASSAAN NEGM

(M.Sc. ORGANIC CHEMISTRY)
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كلية العلوم

Preparation and Characterization of Water Base Co-Polymer Nano Particles and Use it as a Binder for Printing Ink

Ph.D. Thesis

Thesis Supervisors:

Assist.Prof. Dr. Gamal Abdel Aziz Meligi
Assist.Prof.of Organic Chemistry- Chemistry Dept. Faculty of Science
Ain Shams University.

Prof. Dr. Hamada abd El-Wahab Ibrahim
Prof.Dr.of Applied Organic Chemistry- Chemistry Dept. Faculty of Science - Al-Azhar University.

Dr. Manal Hamroush

General Manager of Diamond Company for Inks

"قل إن صلاتي ونسكي ومحياي ومماتي لله رب العالمين"

صدق الله العظيم

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Supervisors' approval:

- **Assist.Prof. Dr. Gamal Abdel Aziz Meligi**

  Assist.Prof.of Organic Chemistry- Chemistry Dept. Faculty of Science

  Ain Shams University.

Signature…….

- **Prof. Dr. Hamada abd El-Wahab Ibrahim**

  Prof.Dr.of Applied Organic Chemistry- Chemistry Dept. Faculty of Science Al-Azhar University.

Signature…….

Head of Chemistry Department

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Mohamed Gomaa Hassaan Negm

Abstract

Nano emulsions of co and ter-polymers of various compositions were generated from styrene (st), vinyl acetate (vam), vinyl versatate (®veova10), butyl acrylate (BuA), ethyl acrylate (EA) ,2-ethyl hexyl acrylate (2-EHA), methylmethacrylate (MMA), acrylic acid (AA), and acrylamide (AAM) monomers by means of a conventional seeded emulsion polymerization technique, using $K_2S_2O_8$ as the initiator. Two surfactant systems were used as well as changing the monomers ratio in the presence of constant ratio of initiator.The characterization of the prepared emulsions was performed using IR, TGA, GPC, and TEM. A selection of (St - BuA) Co-polymers and (VAM - VeoVa10 - BuA) ter-polymers were formulated with pigments and additional ingredients, as water-based flexographic inks. The inks were then investigated by measuring their pH, viscosity, degree of dispersion, water resistance, and color strength density. Also a selection of (EA – EHA - MMA) ter-polymers were formulated in the preparation of over print varnish for offset inks and investigated by testing: viscosity, tackniss, gloss and coffee stain (60-second).

List of Abbreviations

St	Styrene monomer
VAM	Vinyl acetate
®Veova 10	Vinyl Versatate
EA	Ethyl acrylate
2-EHA	2-ethyl hexyl acrylate
MMA	Methyl methacrylate
BA	Butyl acrylate
AA	Acrylic acid
AAM	Acrylamide
ASTM	American stander of testing method
SLS	sodium lauryl sulphate
SULFOPON® 12 G	Sodium salt of fatty alcohol sulphate
NP30	Nonylphenol Ethoxylate
PAM	Polyacrylate monomer
CA	Cetyl alcohol
CMC	Critical micelle concentration
CSTRs	Continuous stirred tank reactors
g	Gram
g/l	Gram perlitter
g/cm^3	gram per cubic centimetre
h	Hour
KPS	Potassium persulfate

M	Monomer
µm	Micrometer
FTIR	Fourier transform infrared
TGA	Thermo gravimetric analysis
GPC	Gel permeation chromatography
TEM	Transmission electron microscope
mg	Milligram
ml	Milliliter
nm	Nanometer
CPS	Centipoise
Np	Number of polymer particles
Rp	The rate of polymerization
Sec	Second
min	Minute
OPV	Overprint varnish
UV	Ultraviolet
Tg	Glass transition temperature
PVC	Poly vinyl chloride
2RXS	Eljon Red, yellow shade red pigment
Red 49:1	Pigment red

Contents

Chapter (2) : Materials and Experimental Techniques

Chapter (3) : Results and discussion