



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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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

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"قل إن صلاتي ونسكي ومحياي ومماتي لله رب

العالمين"

صَدَقَ اللهُ الْعَظِيمُ

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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 |

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