

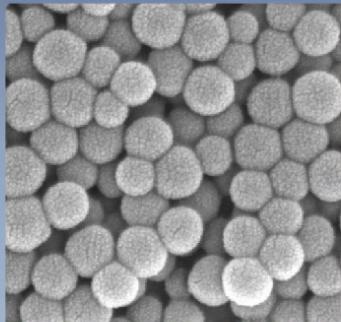


Anna V. Musyanovych (Autor)

Amino Functionalized Latex Particles Obtained in Presence of Surface-Active Initiators

Amino Functionalized Latex Particles
Obtained in Presence of Surface-Active
Initiators

Anna V. Musyanovych



Cuvillier Verlag Göttingen

<https://cuvillier.de/de/shop/publications/3204>

Copyright:

Cuvillier Verlag, Inhaberin Annette Jentzsch-Cuvillier, Nonnenstieg 8, 37075 Göttingen,
Germany

Telefon: +49 (0)551 54724-0, E-Mail: info@cuvillier.de, Website: <https://cuvillier.de>

Table of Contents

1 INTRODUCTION.....	1
1.1 Motivation	1
1.2 Goals	2
1.3 Dissertation Outline.....	3
2 THEORETICAL BACKGROUND.....	4
2.1 Introduction	4
2.2 Emulsion Polymerization	5
2.2.1 Theory of Emulsion Polymerization	6
2.2.2 Homogeneous Nucleation Mechanism	10
2.2.3 Initiators.....	11
2.2.4 Emulsifiers	12
2.3 Functional Microspheres	14
2.3.1 Methodology of Preparation of Functional Latex Particles.....	14
2.3.2 Functional Initiators.....	17
2.3.3 Functional Monomers.....	18
2.3.4 Reactive Surfactants.....	20
2.3.4.1 Surfmers.....	21
2.3.4.2 Transurfs.....	22
2.3.4.3 Inisurfs	23
2.3.5 Functionalization of Preformed Particles	26
2.4 Biomedical Applications of Functional Latexes	27
2.4.1 Immobilization of Biomolecules onto Latex Particles	27
2.4.1.1 Physical Adsorption.....	28
2.4.1.2 Covalent Coupling of Functionalized Particles	28
2.4.2 Bioseparation	31
2.4.3 Cell Labeling.....	31
2.4.4 Diagnostic Immunoassay	32
3 ANALYTICAL METHODS.....	34
3.1 Scanning Electron Microscopy.....	34
3.2 Photon Correlation Spectroscopy.....	36
3.3 Electrophoretic Mobility	37

3.4 X-Ray Photoelectron Spectroscopy	40
4 EXPERIMENTAL PART	44
4.1 Materials.....	44
4.2 Polymerization and Preparation Description.....	45
4.3 Instrumental Characterization.....	48
5 RESULTS AND DISCUSSIONS	57
5.1 Hydroperoxide Containing Surface-Active Initiators.....	57
5.1.1 Synthesis and Characterization of HAS.....	58
5.1.1.1 FT-IR and Raman Spectroscopy.....	59
5.1.1.2 Quantitative Determination of Functional Groups.....	60
5.1.1.3 Thermal Decomposition and Glass Transition Temperature	61
5.1.2 Physico-chemical Properties of HAS	64
5.1.2.1 Critical Micelle Concentration	64
5.1.2.2 Surface Concentrations and Specific Area of Inisurfs	65
5.1.3 Kinetics of Inisurf Thermolysis in Aqueous Medium	67
5.2 Emulsion Polymerization in the Presence of HAS.....	72
5.2.1 Kinetic Studies.....	73
5.2.2 Particle Size, Number of Particles, and Latex Polydispersity	79
5.2.3 Surface Groups Determination	82
5.2.4 Stability of Final Latexes	87
5.3 Latex Particles with Amino Functionality.....	90
5.3.1 "Grafting from" Polymerization.....	91
5.3.2 Characterization of the Functionalized Latexes	94
5.3.2.1 H-NMR analysis.....	94
5.3.2.2 X-ray Photoelectron Spectroscopy (XPS)	95
5.3.2.3 Fluorescence Titration	98
5.3.2.4 Electrophoretic mobility measurements	100
5.4 Latex-Biomolecules Interactions	103
5.4.1 Adsorption of Human IgG	103
5.4.2 Immunoreactivity.....	107
6 CONCLUSIONS AND OUTLOOKS	110
REFERENCES	115