

Sand Arpit
Tuteja Jaya *Editors*

Properties and Applications of Superabsorbent Polymers

Smart Applications with Smart Polymers

 Springer

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Sand Arpit
School of Sciences
Manav Rachna University
Faridabad, Haryana, India

Tuteja Jaya
School of Sciences
Manav Rachna University
Faridabad, Haryana, India

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Preface

The book is written for all researchers in the field of polymer industry. The book features the basics and advanced technology involved in the synthesis and characterization of superabsorbent polymers and is a perfect summary or literature review of superabsorbent polymers' application in versatile areas.

Super absorbent polymers (SAPs) are the materials that are hydrophilic in nature and have the capacity to hold and retain the fluid with high efficiency. The common SAPs used are sugar-like white in appearance and employed in baby diapers/sanitary napkins/personal hygiene products. The SAPs are known for holding body fluid approx. 30 times of their original weight used in any diaper; along with holding and retaining the body fluid it keeps the skin dry and healthy. In previous times, cellulose fluff was used to absorb body fluid which has now been replaced by thinner SAPs in modern times.

The book features the background, literature review, its types, synthesis methods, technologies involved in its synthesis, its experimental methods, physical and chemical properties, its applications in various sectors; recent research works, etc., the major of the literature found in SAP have involved the usage of SAP in disposable diapers/napkins, etc. Here, this book highlights its importance in heat resistance and treatment of industry effluents; SAPs' potential application in agriculture field, drug delivery, nano-filtration, nano-medicines, and biomedical equipment/accessories. Owing to the variety of monomers present SAPs can be synthesized in various types. These SAPs are broadly classified into two types (i) synthetic SAPs (petrochemical-based monomers) and (ii) natural SAPs (monomers based on renewable sources like polysachharide- and polypeptide-sbased).

The SAPs available in market are based on acrylic acid or its salts based synthesized by inverse-suspension polymerization techniques or solution polymerization techniques. There are numerous internal and external factors that influence the synthesis of SAPs ultimately resulting in different physical and chemical properties. The quantification techniques to measure the swelling capacity, absorption capacity (absorption under body weight pressure and absorption without body weight pressure), and load capacity were discussed.

In this book, our focus was not only to list the applications of SAPs but also was to connect the academic knowledge of SAPs with industrial application of SAPs. The book discusses the fundamental approach to the formation of cross-linked super absorbent polymers, its networking, and change in polymer network when it undergoes swelling, etc. These days various new SAPs are being synthesized and investigated for a particular applications or to respond to particular molecule. This is quite an emerging field and continuous researches are going on in this area to explore and invent new biodegradable SAPs to solve the concern of landfills.

Faridabad, India

Sand Arpit
Tuteja Jaya

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Contributors

Charles Oluwaseun Adetunji Applied Microbiology, Biotechnology and Nanotechnology Laboratory, Department of Microbiology, Edo State University Uzairue, Edo, Nigeria

Yahya Bachra Laboratory of Biomolecules and Organic Synthesis (BIOSYNTHO), Faculty of Sciences Ben M'Sick, Department of Chemistry, University Hassan II of Casablanca, Casablanca, Morocco;
Laboratory of Analytical and Molecular Chemistry (LCAM), Faculty of Sciences Ben M'Sick, Department of Chemistry, University Hassan II of Casablanca, Casablanca, Morocco

Cynthia Lizeth Barrera-Martínez Centro de Investigación en Química Aplicada, Saltillo, México

Stephen Rathinaraj Benjamin Laboratory of Behavioral Neuroscience (LBN), Drug Research and Development Center (NPDM), Department of Physiology and Pharmacology, Federal University of Ceará (UFC), Porangabussu, Fortaleza, Ceará, Brazil

Mohammed Berrada Laboratory of Biomolecules and Organic Synthesis (BIOSYNTHO), Faculty of Sciences Ben M'Sick, Department of Chemistry, University Hassan II of Casablanca, Casablanca, Morocco;
Laboratory of Analytical and Molecular Chemistry (LCAM), Faculty of Sciences Ben M'Sick, Department of Chemistry, University Hassan II of Casablanca, Casablanca, Morocco

Gladis Y. Cortez-Mazatan Centro de Investigación en Química Aplicada, Saltillo, México

Joziel Aparecido da Cruz Department of Mining, Metallurgical and Materials Engineering, Federal University of Rio Grande do Sul–UFRGS, Porto Alegre, RS, Brazil

Afonso Henrique da Silva Júnior Department of Chemical Engineering and Food Engineering, Federal University of Santa Catarina-UFSC, Trindade Campus, Florianópolis—SC, Brazil

Fouad Damiri Laboratory of Biomolecules and Organic Synthesis (BIOSYNTHO), Faculty of Sciences Ben M'Sick, Department of Chemistry, University Hassan II of Casablanca, Casablanca, Morocco;
Laboratory of Analytical and Molecular Chemistry (LCAM), Faculty of Sciences Ben M'Sick, Department of Chemistry, University Hassan II of Casablanca, Casablanca, Morocco

Carlos Rafael Silva de Oliveira Department of Textile Engineering, Federal University of Santa Catarina-UFSC, Blumenau Campus, Blumenau, SC, Brazil

Patrícia Viera de Oliveira Department of Chemical Engineering and Food Engineering, Federal University of Santa Catarina-UFSC, Trindade Campus, Florianópolis—SC, Brazil

A. S. Dhaliwal Department of Physics, Sant Longowal Institute of Engineering and Technology, Longowal, Punjab, India

Brenno Henrique Silva Felipe Department of Textile Engineering, Federal University of Santa Catarina-UFSC, Blumenau Campus, Blumenau, SC, Brazil

Alexandre José Sousa Ferreira Department of Textile Engineering, Federal University of Santa Catarina-UFSC, Blumenau Campus, Blumenau, SC, Brazil

Lluvia Azhalea Guerrero-Hernández Centro de Investigación en Química Aplicada, Saltillo, México

Preeti Gupta Discipline of Polymer Science and Chemical Technology, Department of Applied Chemistry, Delhi Technological University, Daulatpur, Delhi, India

Alexander Ikechukwu Ajai Federal University of Technology, Minna, Nigeria

Abel Inobeme Department of Chemistry, Edo State University Uzairue, Edo, Nigeria

Jonathan Inobeme Department of Geography, Ahmadu Bello University, Zaria, Nigeria

John Olusanya Jacob Federal University of Technology, Minna, Nigeria

Eli José Miranda Ribeiro Júnior Department of Pharmacy, Faculty of CGESP (Centro Goiano de Ensino Superior), Goiânia, Goiás, Brazil

Ankit Kumar Department of Physics, Sant Longowal Institute of Engineering and Technology, Longowal, Punjab, India

Maria S. Lavlinskaya Voronezh State University of Engineering Technologies, Voronezh, Russian Federation;
Voronezh State University, Voronezh, Russian Federation

John Tsado Mathew Department of Chemistry, Ibrahim Badamosi Babangida University, Lapai, Nigeria

H. Iván Meléndez-Ortiz CONACyT—Centro de Investigación en Química Aplicada, Saltillo, México

Nkechi Nwakife Federal University of Technology, Minna, Nigeria

Alfred Obar Federal University of Technology, Minna, Nigeria

René D. Peralta-Rodríguez Centro de Investigación en Química Aplicada, Saltillo, México

Roli Purwar Discipline of Polymer Science and Chemical Technology, Department of Applied Chemistry, Delhi Technological University, Daulatpur, Delhi, India

Arpit Sand School of Sciences, Manav Rachna University, Faridabad, India

Jagdeep Singh Department of Physics, Sant Longowal Institute of Engineering and Technology, Longowal, Punjab, India

Amita Somya Department of Chemistry, School of Engineering, Presidency University, Bengaluru, India

Andrey V. Sorokin Voronezh State University of Engineering Technologies, Voronezh, Russian Federation

Jorge Luis Sánchez-Orozco Centro de Investigación en Química Aplicada, Saltillo, México

Jaya Tuteja School of Sciences, Manav Rachna University, Faridabad, India

Nívea Taís Vila Department of Textile Engineering, State University of Maringá-UEM, Goioerê, PR, Brazil

Aparna Vyas Department of Mathematics, Manav Rachna University, Faridabad, India