POLYMERUPDATE® ACADEMY

EDUCATIONEM RESPONSUM EST

POLYURETHANE INNOVATIONS AS MEDICAL MATERIALS

Prepared & Conducted by

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Key Focus Areas

- How does one define a polyurethane?
- How are polyurethanes useful in medical applications?
- What precautions do we need to take to apply polyurethanes as biomaterials?
- What applications are they being currently used in?

Summary

- As the use of medical devices in the treatment of many conditions has significantly increased worldwide, it is essential to comprehend the nature of the biomaterials constituting these devices. Such an understanding will enable the efficacious use of the biomaterials in their current applications and allow the fundamental properties to be applied toward a greater advancement of medical technology.

- Ever since its first application in the 1960s, the use of polyurethanes as biomaterials has dramatically increased in several medical devices. The areas of utilization of polyurethane formulations in medical applications have continuously grown as new aspects of polyurethane chemistry and characteristics are being exploited.

- This course explores the different possibilities within chemistry, structure-property, and processing of polyurethanes, which enables the existing biomaterial applications and can lead to future applications within the medical field. This course can be seen as an update to the existing texts on polyurethanes as biomaterials as well as shedding new light on the various aspects of polyurethanes that can enable their use in new applications.

- This course is organized into four lecture topics. The first topic serves as an introduction to the world of polyurethanes and medical devices, is a primer of the basic chemistry of polyurethanes and the manufacturing techniques involved with the fabrication of polyurethanes. The chemistry involved combined with the manufacturing technique has a significant bearing on the organization of the polyurethane and its resultant structure-property relationships. This first topic deals with these relationships and measurement techniques.

- The behavior of polyurethanes in their interaction with biological systems is the key to the performance of the material as a biomaterial. The second topic describes this material-body interaction in a comprehensive manner. An integral aspect, that the topic deals with, is the ability of the formulation to be converted into the desired shape and form of a medical device. The topic deals with questions of safety of the polyurethane formulations as parts of life saving medical devices.

- The third topic details some of the applications of current medical devices using polyurethanes and provides some backgrounds of the associated body systems and organs.

- There are several emerging technologies where new application areas for polyurethanes can enable newer treatment options. The fourth topic explores these emerging areas.

Lecture 1: Fundamentals of Polyurethanes

- Chemistry
- Manufacturing and Processing
- Structure and Properties

Lecture 2: Use of Polyurethanes as Biomaterials

- Fundamentals of biocompatibility and biostability
- Short-term and long-term implantation
- Processing polyurethanes into medical devices
- Life saving devices with polyurethanes

Lecture 3: Current Applications

- Cardiovascular devices
- Orthopaedic devices
- Neurological devices
- Other

Lecture 4: Technological innovations and emerging applications

- Drug Delivery
- Biodegradable formulations
- Biosensors

Who should attend?

This is a technical training with an emphasis on linking polyurethane chemistry, performance, properties and processing attributes to use in medical applications.

It will be beneficial that the audience participants have some background in chemistry, chemical engineering, materials science, or related disciplines.

- Industry professionals working with medical devices applications.
- Professionals working with polyurethanes and seeking to broaden into medical applications.
- Marketing and Commercial Professionals in the medical field looking to broaden/deepen their understanding of polyurethane technology.
- Business owners and entrepreneurs with a interest in polyurethane solutions and innovative products within medical applications.
- Academicians and researchers within the field of medical applications and biomaterials.
- Students studying polymer/polyurethane chemistry and technology.

What will you learn?

- The versatility of polyurethane chemistry, manufacturing methods, structure and properties.

- The fundamentals of using polyurethane materials in medical applications. The meaning of biocompatibility, the importance of biostability and implantation guidelines.

- The assessment of polyurethanes in their ability to be manufactured as medical devices and subsequent safety aspects.

- A background of the body organ system and where polyurethanes find use in the current medical device applications.

- Evaluating polyurethanes as materials for use in emerging and future medical applications.

DR. AJAY D PADSALGIKAR

Bachelor of Engineering, Polymer Engineering, Ph.D., Polymer Science & Engineering

Dr. Ajay graduated with a degree in Polymer Engineering from the University of Poona, India in 1990. He then completed a PhD from Clemson University, SC, USA in 1996. In the field of polyurethanes, Ajay has over 20 years of experience. He has worked at different companies, Huntsman Polyurethanes in Belgium, AorTech Biomaterials in Australia, Abbott Labs in Minnesota and DSM Biomedical in Pennsylvania. Ajay has been involved with different aspects of polyurethane chemistry, morphology, and processing for medical devices.

Dr. Ajay joined Biolinq Inc., San Diego, California, as a Technical Director in July 2022, where he is working on a range of material solutions for biosensors in medical devices.

Dr. Ajay has more than 30 published scientific papers and 10 patents. He has also authored two books, 'Plastics in Medical Devices for Cardiovascular Applications' and 'Applications of Polyurethanes in Medical Devices' published

At Polymerupdate Academy, we offer a broad range of courses in the Petrochemical and allied industries, in collaboration with renowned professors from the field of education. The courses address the critical, technical and managerial needs in both the Public and Private sectors and are unique to each individual client.

Learn about the many benefits of cutting-edge, online educational courses for a life-long career in the fields of Polymer Science and Composites. We have ensured that the courses are affordable yet valuable and play a keyrole in upskilling those who sign up for the training. These courses are carefully designed to help professionals manage everyday challenges with greater confidence and expertise.

The Polymerupdate Academy also provides customised corporate training courses to assist businesses with their specific requirements. We believe that capitalizing on effective training to equip employees with expanded market knowledge, is a key to greater efficiency and achievement, not just for the business alone, but for the industry as a whole. The various courses provided at the academy, address the critical, technical and managerial needs in both the public and private sectors.

The Customised course programmes are created through sessions based on detailed requirements with a balance of theoretical ideas and creative inputs. Mix and match your expertise and build a course that suits you best!

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Replacement Policy: However, participants have the option to send a replacement attendee by informing the organizers in advance by email.

Individual photographs or testimonial videos are not automatically provided; requests for such materials must be emailed to the organizing committee and are subject to approval.

Acknowledgment

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We thank you for your understanding and cooperation in ensuring that our training program remains a productive and respectful environment for all involved.

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