Polish-Israeli Conference on Electrospinning and Tissue Engineering

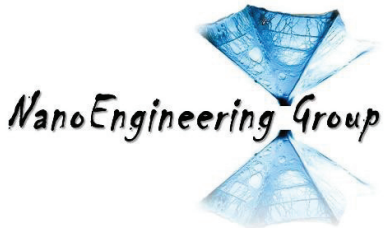
Programme and Abstracts

04 - 05 October 2018

Warsaw, Poland

Organizers

Laboratory of Polymers & Biomaterials at Institute of Fundamental Technological Research Polish Academy of Sciences (IPPT PAN) based on the fundamental knowledge in the area of polymer physics, materials science, chemistry and biotechnology, focuses its recent activity on biomaterials for tissue engineering. Great part of our activity is related to polymeric biodegradable scaffolds, mostly formed by electrospinning as nanofibrous structures, both for tissue regeneration and materials for controlled drug release.



Nano Engineering Group at Technion Israel Institute of Technology is focused on research in the field of molecular engineering of soft matter. The particular activities are related to the electrospinning including optimization of the parameters of the process, deep understanding of the fundamental physical facets of electrospinning as well as designing a composite materials for tissue engineering applications.

Objectives

The goal of PICETE conference is to bring together experts from around the world in order to exchange their knowledge, experience and research innovation in the basics of the electrospinning and the broad area of biomedical materials covering topics related to designing, fabrication, characterisation and tissue engineering applications.

The conference will include the following topics:

- Fundaments of electrospinning
- Optimization of electrospinning
- Properties of electrospun nanofibers
- Functionalization of electrospun nanofibers
- Electrospun nanofibers as scaffolds for tissue engineering/drug delivery systems
- Current trends in designing of polymeric biomaterials for tissue engineering/drug delivery systems

The effect of electrospinning parameters on selected properties of polyelectrolytes' fibres

Olga Urbanek[1], Pawel Sajkiewicz[2],

[1,2]Institute of Fundamental Technological Research,

Polish Academy of Sciences,

A. Pawińskiego 5b, 02-106 Warsaw, Poland

Abstract

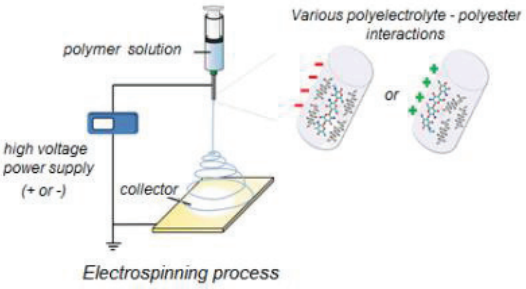
The processing of polyelectrolytes using electrospinning technique is difficult due to the accumulation of charges in the polymer solution and complex interactions of polyelectrolytes with solvent [1]. Moreover, the polarity applied to the spinning nozzle may influence on components interactions and final material properties [2,3].

The studies were divided into two stages. On the first stage the aim of the research was to investigate the effect of two solvent systems on poly(ε-caprolactone)/chitosan (PCL/CHT) fibres' spinnability, structure and properties. On the second stage the effect of polarity applied to the spinning nozzle on the structure and properties of bicomponent PCL/CHT fibres were analysed. amino groups on the fibers surface and its further surface modification with chondroitin sulfate (CS). For this research PCL/CHT nanofibers with 5-25% w/w of chitosan were formed by electrospinning technique.

Results obtained by various experimental methods clearly indicated the effect of the solvent system on the structure and properties of the fibres. Viscosity measurements and infrared spectroscopy (AFM-IR, FTIR) studies confirmed different polymer–solvent interactions, revealing the chitosan salts formation in the case of the AA/FA solvent system. Consequently this differences affected fibres morphological and structural characteristic [4].

On the second stage of the research, results indicated stronger interactions while negative polarity was applied to the spinning nozzle. As a result fibres diameter revealed different size distribution and PCL crystallinity were changed. Moreover, some properties like wettability, mechanical properties as well as the efficiency of adsorption of bioactive compounds (chondroitin sulphate, CS) were changed. In order to analyse presented issues, techniques like atomic force microscopy (AFM), scanning electron microscopy (SEM), differentl scaning calorimetry (DSC) or X-ray photoelectron spectroscopy (XPS) were used [5].

Image



Electrospinning process

References

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Acknowledgments

The project was financed by National Science Centre within the PRELUDIUM grant No. 2014/15/N/ST8/03757.

Biography

A motivated and enthusiastic materials science engineer interested in polymers for tissue engineering, its surface modification and processing. Currently, focused on electrospinning of polyelectrolytes blends. The author of 7 scientific papers in the field of electrospun biomaterials and conductive fibres for organic solar cells. The laureate of the Kosciuszko Foundation Award and the author/ principal investigator of research project for young scientists (PRELUDIUM grant).

Email: ourbanek@ippt.pan.pl