



Foreword

On behalf of the Scientific Committee of the Baltic Polymer Symposium 2014 I have the pleasure of introducing this special issue of selected papers presented at the Symposium.

The Baltic Polymer Symposia have a long tradition, initiated more than ten years ago by universities and research institutions in the Baltic States. This Symposium, organized by the Tallinn University of Technology, is the 14th. Today, the importance of these symposia is growing continuously as well as the number of the participants and countries. In this year we had participants from Germany, Georgia, Belarus, Russia, Ukraine, Finland, France, Turkey, and Nigeria and, of course, numerous participants from the Baltic States, altogether more than 150.

Symptomatic to these symposia is a large number of doctoral students and young researchers among the participants.

Today the scope of the Symposium is broad, including theoretical as well as practical problems of polymeric materials – the synthesis, processing technology, physical and chemical properties as well as practical applications – from natural polymers to the synthetic ones, to composite materials and hybrid structures with inorganic compounds.

From year to year the number of presentations devoted to the polymer materials as functional materials is increasing with practical applications as electronic materials and devices, as sensor materials in environmental analytical chemistry, in medicine, and etc.

In this year, an interesting paper, describing synthesis of functional and modified polylactones, was presented. Mastering liquid to solid transition makes it possible to use these biopolymers in advanced 3D manufacturing techniques like in fused deposition modelling or stereolithography. Scaffolds with improved bioactivity and biocompatibility have been presented for application in orthopedics.

Molecularly imprinted polymers is the new type of functional materials with promising applications in analytical chemistry, environmental chemistry, and medicine. At this Symposium, results on preparing and

application of different antibiotic-imprinted polymer films, prepared by the electrochemical method on different label-free sensor platforms and comparing their performance in terms of sensitivity and selectivity to bind target molecules as pharmaceutical environmental pollutants, were presented.

It is remarkable that a new class of functional materials, electrically conductive polymers, as well as organic charge-transporting materials, hydrazones, have obtained a strong position in our symposia among traditional polymer materials. A number of papers about the organic charge-transporting materials as thiophene-based polymers, used for the fabrication of various optoelectronic devices such as light emitting diodes, photovoltaic cells, organic transistors, and electrographic photoreceptors were also presented. Growing interest has been focused on finding materials with ambipolar charge-transporting characteristics for application in light-emitting diodes and other optoelectronic devices.

Hybrid organic/inorganic molecular-organized materials, based on conjugated polymers and inorganic nanoparticles, are of great interest for developing new types of bulk-heterojunction based plastic solar cells and light emitting diodes, sensors, catalytic and electrocatalytic systems.

Physical and chemical properties of CdSe nanowires for hybrid solar cell structures (CdSe/CdTe structures) were reported. Fabrication techniques such as electro-deposition and spin-casting were applied step-by-step to prepare complete hybrid photovoltaic structures.

Traditionally, a number of reports were dedicated to mechanical and structural properties as well as to the physical and chemical properties of polymers, depending on the preparation technology. Development and design of biobased biodegradable polymers and composite materials has been stimulated by the continuously growing public concern about the pollution of our environment. Also the properties of the degradable plastics were investigated in many presentations.

A number of papers considered using of electro-spinning methods for the preparation of nanostructured

polymers. The aim of these investigations was to find out the best conditions to produce electrically conductive fibres by electrospinning and to study the influence of the solution, conductive fillers and electrospinning parameters on the morphology and conductivity of electrospun membranes.

Altogether the program of the Symposium included 27 oral and 87 poster presentations, covering practically all aspects of polymer engineering, science and technology. In this special issue only a limited number of papers presented at the Symposium are published. However, they give an overview of the wide range of topics in polymer science investigated nowadays.

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Chairman of the Scientific Committee
Baltic Polymer Symposium 2011

Andres Öpik received his CandSc (PhD) in Chemistry from the University of Tartu in 1980. Currently he is a Professor of Physical Chemistry at Tallinn University of Technology, Member of the Estonian Academy of Sciences.



At present his main research field is material science and technology: investigation of the physical and chemical properties and possibilities for practical applications of different polymeric materials—electrically conductive polymers, molecularly imprinted polymers, and inorganic semiconductive compounds in hybrid structures with electrically conductive polymers.

Under his supervision 7 doctoral dissertations have been defended. In 2004–2008 his research group belonged to the Estonian and European Centre of Excellence in Chemistry and Materials Technology. In 1985 and 2006 A. Öpik was awarded the Estonian Science Prize. He has published 5 study books and over 200 research papers in refereed journals.