

# BOOK of ABSTRACTS

## 25<sup>th</sup> Congress of Chemists and Technologists of Macedonia



19-22 9 2018  
OHRID, R MACEDONIA





**Сојуз на хемичарите и технолозите на Македонија**

**Society of Chemists and Technologists of Macedonia**

**25<sup>th</sup> Congress of SCTM  
with international participation**

**BOOK of ABSTRACTS**

**19–22 September 2018  
Metropol Lake Resort  
Ohrid, R. Macedonia**



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**Society of Chemists and Technologists of Macedonia**

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Goce Delčev University, Štip



The 25<sup>th</sup> Congress of SCTM is a



recognized event.

Dear Colleagues,

Welcome to the 25<sup>th</sup> Congress of the Society of Chemists and Technologists of Macedonia. Although this is our silver jubilee, our society is celebrating more than 50 years of scientific meetings. The first conference, one of the first activities of our society, was organized in the 1960-ties and was a meeting between the faculties of the Institute of Chemistry at Faculty of Sciences and Mathematics and the Faculty of Technologists, both at the Ss. Cyril and Methodius University in Skopje. They gradually grew into biennial meetings and attracted participants outside of Macedonia. Beginning from the 18<sup>th</sup> Congress in 2004 all our meetings are held in the exceptional setting of Lake Ohrid. In 1994 our society started to organize students' scientific meetings and now the two alternate, so there is a congress organized by our society every year.

Since 2012 we have been using the Open Journal System to manage the editorial process of the [\*Macedonian Journal of Chemistry and Chemical Engineering\*](#) published by our society. In order to streamline the technical management of this congress and future such meetings, we have undertaken for the first time to implement the Open Conference System. You are all now familiar with the whole process of registering, submitting the abstracts etc. – at times you/we did encounter problems but overall we are satisfied with this platform and plan to use it in the future. For all of you who have smart phones, you will find the abstracts and schedule online which can be searched by various criteria. Furthermore, in line with the digital age we live in, for the first time we will not have a printed Book of Abstracts but only an electronic one. A draft version with all submitted abstracts along with the conference program was uploaded to the platform three weeks ago. The final version will be available after the conference and only the presented contributions will be included. Another first at this conference will be a Skype presentation on Saturday. We hope in the future to further improve the technical capabilities by streaming at least some of the lectures online.

Next year the world will be celebrating 150 years of Mendeleev's Periodic table of the chemical elements. Our society was involved from the very beginning two years ago – we immediately contacted our representative to UNESCO to give our full support for this important event marking one of the few discoveries in science that has withstood such a long test of time. It is nice to see the world united in a scientific achievement despite the extreme polarization in other areas. I believe you share my opinion that we are so fortunate to have chosen to pursue chemistry, the ever evolving science. Whenever I hear divisive undignified debates that take place so often now, the words of Sir Humphrey Davy in his discourse delivered at the Royal Society, in November 1825 echo in my ears: *Fortunately science, like that nature to which it belongs, is neither limited by time nor by space. It belongs to the world, and is of no country and of no age. The more we know, the more we feel our ignorance; the more we feel how much remains unknown; and in philosophy, the sentiment of the Macedonian hero can never apply, – there are always new worlds to conquer.*

From the more than 250 contributions given in this book we have a truly diverse body of researchers in many fields of chemistry. But more important than the number is the quality of the scientists presenting their new results: we have two exceptional keynote speakers, 10 invited speakers, 49 oral presentations and 195 poster presentations. Due to the traditional environment of tolerance in Macedonia, it is a truly unique regional conference bringing together the scientists from a very wide area.

I would like to thank sincerely the presidents of the Organizing and Scientific Committees, Prof. Viktor Stefov and Prof. Trajče Stafilov. Also, I must mention Assistant Prof. Jasmina Petreska-Stanoeva and Prof. Marina Stefova. I think this is the best team we could put together to make a really flawless organization. Furthermore, I would like to thank the Ministry of Education and Science of Macedonia, the Ss. Cyril and Methodius University in Skopje and the Goce Delčev University in Štip for their financial support, as well as the commercial sponsors that are given at the end of this book for their financial support and/or support in their products.

I do hope you will enjoy the scientific program of this congress, the interactions with colleagues from other institutions and countries and will build new relationships and collaborations. Most of all I would like to ask you to spend some time with the young researchers and students present here – for one of our main goals is also to build on the nexus between education and research and inspire and energize the young in the intricacies of the science of chemistry. I know I do not need to tell you to enjoy this magnificent lake, for us the most beautiful lake in the world, the inspirational crammed with extraordinary churches city of Ohrid and its unique heritage to world civilization.

Prof. Zoran Zdravkovski, president  
Society of Chemists and Technologists of Macedonia

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## **Textile Engineering (TE)**

**TE O-2****THE INFLUENCE OF THE BLEACHING AND DYEING PROCESSES ON THE COMFORT PROPERTIES OF KNITTED FABRICS CONTAINING ELASTANE**

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Comfort properties of knitted fabrics depend on various fabric characteristics such as chemical composition, knitted structure (fabric thickness and weight), air permeability and water vapour resistance. The purpose of this investigation is to study the influence of different elastane content and different processing stages (bleaching and dyeing) on the comfort properties of single jersey knitted fabrics. Samples made of 100% cotton (20 tex ring spun yarn) and elastane yarn (22 dtex multifilament yarn) in alternating courses (half plating) and elastane yarn in every course (full plating) were scoured, bleached or dyed. Bleaching was done with 50% H<sub>2</sub>O<sub>2</sub> and dyeing in dark blue shade with reactive dyes.

In comparison with 100% cotton knitted fabrics, cotton/elastane fabrics have increase fabric thickness for about 5-16%, fabric weight for about 8-21%, and water vapour resistance for about 11-30%, but decrease air permeability for about 28-51%. Increased fabric thickness is a result of plating which means the simultaneous formation of one loop from two threads, so that one thread will lie on the face of the fabric, while the other thread is fed to the needles in such a way that it forms the back or reverse of the final fabric. In this case, the largest distance between two points of the cross section of the knitted fabric will increase because over cotton yarn is elastane yarn. With the increase of the fabric thickness, fabric weight increases too. 100% cotton knitted fabrics, being smoother and coarser as compared to cotton/elastane assist easier passage of water vapour and air through it, resulting in lower water vapour resistance and higher air permeability. The increased water vapour resistance and reduced fabric air permeability can be attributed to the higher thickness, fabric weight and compactness accompanied with a higher elastane content, which hard segments offer limited water vapour and air flow through knitted fabrics.

Insignificant differences in comfort properties (excluded air permeability) were found after different finishing stages. Bleached knitted fabrics have about 4-10% lower thickness, 4-11% lower fabric weight, 2-8% lower water vapour resistance, and 8-30% higher air permeability compared to dyed knitted fabrics. There are many factors that affect comfort properties, such as concentration of chemical agents, pH, temperature and duration of the treatment. Scouring and bleaching were done in high alkaline conditions with strong oxidative agent. In such conditions the cotton became stiffer, wax components were saponified, the fibers in yarns became closer, which resulted in a lower yarn cross-section and reduction of the fabric thickness, fabric weight and water vapour resistance. As the loop is clearer, the air permeability of bleached knitted fabrics is higher. On the other hand, dyeing in dark shade was done in milder conditions, which resulted in higher fabric thickness, fabric weight and water vapour resistance, and lower air permeability in regard to bleached knitted fabrics.

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**Keywords:** cotton, elastane, knitted fabrics, comfort properties, bleached, dyed.

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