



# MME SEE

CONGRESS 2023

5<sup>th</sup> Metallurgical & Materials Engineering  
Congress of South-East Europe  
Trebinje, Bosnia and Herzegovina  
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BOOK OF  
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## **PREFACE**

On behalf of the Scientific and Organizing Committee, it is a great honor and pleasure to wish all the participants a warm welcome to the Fifth Metallurgical & Materials Engineering Congress of South-East Europe (MME SEE 2023) which is being held in Trebinje, Bosnia and Hercegovina, 07 - 10 June 2023.

The MME SEE 2023 is a biannual meeting of scientists, professionals, and specialists working in the fields of metallurgical and materials engineering. The aim of the Congress is to present current research results related to processing/structure/property relationships, advances in processing, characterization, and applications of modern materials. Congress encompasses a wide range of related topics and presents the current views from both academia and industry: Future of metals/materials industry in South-East European countries; Raw materials; New industrial achievements, developments and trends in metals/materials; Ferrous and nonferrous metals production; Metal forming, casting, refractories and powder metallurgy; New and advanced ceramics, polymers, and composites; Characterization and structure of materials; Recycling and waste minimization; Corrosion, coating, and protection of materials; Process control and modeling; Nanotechnology; Sustainable development; Welding; Environmental protection; Education; Accreditation & certification.

The editors hope that Congress will stimulate new ideas and improve knowledge in the field of metallurgical and materials engineering. The Congress has been organized by the Association of Metallurgical Engineers of Serbia, with the co-organization of the Institute for Technology of Nuclear and Other Mineral Raw Materials, Belgrade, Serbia, Faculty of Technology and Metallurgy, University of Belgrade, Serbia, Faculty of Technology, University of Banja Luka, Bosnia and Herzegovina; the Faculty of Metallurgy, University of Zagreb, Sisak, Croatia; the Faculty of Natural Sciences and Engineering, University of Ljubljana, Slovenia; and the Faculty of Metallurgy and technology, University of Podgorica, Montenegro.

Financial support from the Ministry of Science, Technological Development and Innovation of the Republic of Serbia to researchers from Serbia for attending the congress is gratefully acknowledged. The support of the sponsors and their willingness to cooperate have been of great importance for the success of MME SEE 2023. The Organizing Committee would like to extend their appreciation and gratitude to all sponsors and friends of the conference for their donations and support.

We would like to thank all the authors who have contributed to this book of abstracts and also the members of the scientific and organizing committees, reviewers, speakers, chairpersons, and all the conference participants for their support of MME SEE 2023. Sincere thanks to all the people who have contributed to the successful organization of MME SEE 2023.

On behalf of the 5<sup>th</sup> MME SEE Scientific and Organizing Committee

Miroslav Sokić, PhD

## **ELECTROCHEMICAL SENSORS FOR DETECTION OF BISPHENOLS**

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The endocrine-disrupting chemicals (EDCs) are chemicals of very high concern that have hazards with serious consequences on human health. It influences on development of metabolic disorders, reproduction and respiratory problems. They can be found in our everyday life, from food, and personal care products to medical devices, dental products, special lenses and baby drink cans. Among several EDCs, banned Bisphenol A (BPA) and his substitute Bisphenol S (BPS) have attracted attention due to high usage during the manufacturing process for water and food packaging, in the production of epoxy resins, lacquer coating and can even be found in receipt. Due to that, there is a need for the fast, reliable and commercial detection of Bisphenols in everyday life. The gold standard for the detection of Bisphenols is chromatography and enzyme-linked immunosorbent assay, expensive and robust methods. Electrochemical sensors are a new approach to the detection of EDCs in very small quantities in complex environments. The aim of this research was to study commercial screen-printed electrodes (SPEs) as receptor elements in electrochemical sensors for the detection of BPA and BPS. Scanning electron microscopic (SEM) and Fourier transform infrared spectroscopy (FT-IR) were employed for examining the surface of the SPEs working electrodes. SPE electrodes showed very good voltammetric responses toward BPA and BPS oxidation with linear ranges between 0.5 and 50.0  $\mu\text{M}$  and lower limits of detection of 0.15  $\mu\text{M}$  and 0.37  $\mu\text{M}$ , respectively.

**Keywords:** electrochemical sensor, bisphenol S, carbon screen printed electrode, cycle voltammetry, electrochemistry.