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4th International Symposium of Environmental Management – Towards Circular Economy

BOOK OF ABSTRACTS

December 7–9, 2016

Faculty of Chemical
Engineering and Technology
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ENVIRONMENTAL MANAGEMENT
*TOWARDS CIRCULAR ECONOMY***



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FOREWORD

On behalf of the Scientific and organizing committee we would like to welcome you all to the 4th International Symposium on Environmental Management, Towards Circular Economy in Zagreb, Croatia that is going to be held on December 7– 9, 2016.

This Symposium follows the success of earlier SEM meetings: SEM2003, SEM2007, SEM2011 all held in Zagreb organized by the Faculty of Chemical Engineering and Technology of the University of Zagreb. As an International Symposium SEM2016 offers a great opportunity and unique platform for networking and learning about the latest advances and development in the field, it encourages open and unscripted discussions on all aspects of Environmental Management, Circular Economy, Green Technologies, Advanced Materials, Renewable Energy, Sustainable Building, Air Pollution and Control, Coastal and Marine Management, Water and Wastewater Management, Waste Management and Urban Mining, Soil and Forestry, Risk Assessment and Management, Environment and Health.

The SEM2016 Symposium has a well-structured scientific program with a large number of presentations dealing with the latest scientific advances and development given by experts in the field who are coming from the Universities and Research Institutions from various countries; Spain, Greece, Slovenia, USA, Ireland, Uzbekistan, Bosnia and Herzegovina, Egypt, Turkey, Algeria, Bulgaria and Croatia. The programme provides therefore ample opportunity for all participants to discuss, exchange and to share their ideas, and to identify and highlight emerging and future areas of research. SEM2016 Symposium offers also an opportunity for young scientists to actively participate by presenting their doctoral research findings and follow up discussions by assuring the Young scientist award.

Finally, we would like to express our sincere gratitude to all who supported and contributed by their hard work to make this meeting a great success, and to thank all the participant and wish you all a very fruitful scientific week and to have an enjoyable time in Zagreb during advent time.

Natalija Koprivanac
AnaLončarić Božić
Hrvoje Kušić
Chairs of the Scientific and organizing committee

SELECTION OF LOW-COST SORBENTS AS A POTENTIAL POSSIBLE MATERIAL FOR A PERMEABLE REACTIVE BARRIER BASED ON A BATCH STUDY

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Maintaining of good quality of groundwater is of great public interest worldwide. However, this source is highly vulnerable to different pollution sources such as industry, mining, irrigation, and so on. The pollution problems are more often observed in Karst areas where large amounts of fresh water can be contaminated in a short time. The application of an *in situ* technique for remediation of contaminated groundwater is highly recommended due to its simplicity of performance and economic benefit. Among *in situ* techniques, the permeable reactive barrier is the most attractive method as it allows for using different materials in the barrier for remediation of contaminated groundwater. Materials for PBR must demonstrate good contaminant binding properties, the ability of their retention, excellent hydraulic properties, satisfactory mechanical properties for safe performance, and ensure a smooth flow through the barrier without disturbing the natural flow. Nowadays the research is focused on investigation of different natural materials to protect the environment, due to their low cost and availability in nature in large quantities. The purpose of this work is to investigate the efficacy of various natural materials such as natural and iron-modified zeolite, apatite, concentrated apatite, kaolin and raw bentonite to remove heavy metals (lead and cadmium) from contaminated groundwater using the *in situ* PBR. The batch test involves sorption experiments followed by leaching experiments. In sorption experiments, the amounts of metal removal by different sorbents were evaluated for cadmium and lead from simulated wastewater with similar initial metal concentrations. The leaching experiment included evaluation of metal retained by the saturated sorbents in ultrapure water with adjusted pH values at 2.98 and 6.07. Additionally, pH values of solutions were recorded during both experiments. Based on obtained results, the sorbents that provide the optimal metal removal and their retaining from the contaminated groundwater were selected.