Editor
Aida Bulucea

Recent Advances on Environmental and Life Science

- Proceedings of the 9th International Conference on Energy and Development, Environment and Biomedicine (EDEB '15)
- Proceedings of the 8th International Conference on Waste Management, Water Pollution, Air Pollution, Indoor Climate (WWAI '15)
- Proceedings of the 7th International Conference on Climate Changes, Global Warming, Biological Problems (CGB '15)
- Proceedings of the 7th International Conference on Natural Hazards (NAHA '15)
- Proceedings of the 5th International Conference on Geography and Geology (GEO '15)

Seoul, South Korea, September 5-7, 2015

- Proceedings of the 3rd International Conference on Integrated Systems and Management for Energy, Development, Environment and Health (ISMAEDEH '15)

Sliema, Malta, August 17-19, 2015

Recent Advances on Environmental and Life Science

RECENT ADVANCES on ENVIRONMENTAL and LIFE SCIENCE

Proceedings of the 9th International Conference on Energy and Development, Environment and Biomedicine (EDEB '15)
Proceedings of the 8th International Conference on Waste Management, Water Pollution, Air Pollution, Indoor Climate (WWAI '15)
Proceedings of the 7th International Conference on Climate Changes, Global Warming, Biological Problems (CGB '15)
Proceedings of the 7th International Conference on Natural Hazards (NAHA '15)
Proceedings of the 5th International Conference on Geography and Geology (GEO '15)

Seoul, South Korea
September 5-7, 2015

Proceedings of the 3rd International Conference on Integrated Systems and Management for Energy, Development, Environment and Health (ISMAEDEH '15)

Sliema, Malta
August 17-19, 2015

Energy, Environmental and Structural Engineering Series | 40

ISSN: 2227-4359
ISBN: 978-1-61804-332-0

RECENT ADVANCES on ENVIRONMENTAL and LIFE SCIENCE

Proceedings of the 9th International Conference on Energy and Development, Environment and Biomedicine (EDEB '15)
Proceedings of the 8th International Conference on Waste Management, Water Pollution, Air Pollution, Indoor Climate (WWAI '15)
Proceedings of the 7th International Conference on Climate Changes, Global Warming, Biological Problems (CGB '15)
Proceedings of the 7th International Conference on Natural Hazards (NAHA '15)
Proceedings of the 5th International Conference on Geography and Geology (GEO '15)

Seoul, South Korea
September 5-7, 2015

Proceedings of the 3rd International Conference on Integrated Systems and Management for Energy, Development, Environment and Health (ISMAEDEH '15)

Sliema, Malta
August 17-19, 2015

Published by WSEAS Press
www.wseas.org

All papers of the present volume were peer reviewed by no less that two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.

ISSN: 2227-4359
ISBN: 978-1-61804-332-0

RECENT ADVANCES on ENVIRONMENTAL and LIFE SCIENCE

Proceedings of the 9th International Conference on Energy and Development, Environment and Biomedicine (EDEB '15)
Proceedings of the 8th International Conference on Waste Management, Water Pollution, Air Pollution, Indoor Climate (WWAI '15)
Proceedings of the 7th International Conference on Climate Changes, Global Warming, Biological Problems (CGB '15)
Proceedings of the 7th International Conference on Natural Hazards (NAHA '15)
Proceedings of the 5th International Conference on Geography and Geology (GEO '15)

Seoul, South Korea
September 5-7, 2015

Proceedings of the 3rd International Conference on Integrated Systems and Management for Energy, Development, Environment and Health (ISMAEDEH '15)

Sliema, Malta
August 17-19, 2015

Table of Contents

Plenary Lecture 1

Ceramic Materials for Clean Energy and Environment: Precise Crystal Structure and Properties

Professor Masatomo Yashima
co-authors: Kotaro Fujii, Masahiro Shiraiwa, Keisuke Hibino
Department of Chemistry and Materials Science
Tokyo Institute of Technology
Japan
E-mail: yashima@cms.titech.ac.jp

Abstract: In this plenary talk, we present the precise crystal structure and its correlation with the properties of some ceramic materials for clean energy and environment. Electron-density distributions of crystalline materials can be obtained by the maximum-entropy method (MEM) analysis of X-ray powder diffraction data and are useful to study the chemical bonding, which governs almost all the material properties. Here, we report the electron-density distributions of perovskite-type ferroelectric oxides and oxynitride photocatalyts, and of K_2NiF_4-type oxides. The strong covalent bonding makes the shorter and longer bond lengths, which makes the electric polarization and ferroelectricity. The covalent bonding in photocatalyts makes the band width wider, which reduces the band gap, leading to the visible-light responses. In K_2NiF_4-type oxides such as $CaYAlO_4$ and $LaSrAlO_4$, the minimum electron density of Al-apical oxygen bond is lower than that of Al-equatorial oxygen one, which makes the anisotropic thermal expansion of these materials. Neutron scattering length density distribution of crystalline materials can be obtained by the MEM analysis of neutron powder diffraction data and are useful to study the mechanism of ion diffusion and ion conduction. Here, we also report the neutron scattering length density distributions of fluorite-type, perovskite-type, K_2NiF_4-type oxide-ion conductors, proton conductors and lithium-cation conductors.

Brief Biography of the Speaker: Full Professor Dr. Masatomo Yashima has been a full professor in the Department of Chemistry and Materials Science at the Tokyo Institute of Technology (Tokyo Tech), from April 2011 to the present. He received a B.S. in Physics from Tsukuba University in 1986 and obtained a Ph.D. in Materials Science and Engineering from the Tokyo Institute of Technology in 1991. He was a Research Associate of Tokyo Tech from 1991-1997 and an Associate Professor of Tokyo Tech from 1997 to March 2011. His current research interests: Precise crystal structure analysis with high-temperature neutron and synchrotron powder diffraction, electron/nuclear density analysis and design of inorganic crystalline materials (ionic conductors, catalysts, ferroelectrics, photocatalysts, and biomaterials). He published over 500 papers, including over 201 original research papers (cited over 6261 times [h-index = 43] in Web of Knowledge, August 13, 2015; over 7906 times [h-index = 48] in Google Scholar, August 19, 2015). He received over twenty awards including the Award of the Ceramic Society of Japan (2009), the Award of the Crystallographic Society of Japan (2008).

Plenary Lecture 2

Management of Sustainable Products and Services Using the Eco Concept

Associate Professor Badea Lepadatescu
Department of Manufacturing Engineering
Faculty of Technological Engineering and Industrial Management
Transilvania University of Brasov
Romania
E-mail: lepadatescu@unitbv.ro

Abstract: We are confronted today with the challenges of designing sustainable products, processes and services. It is not anymore an option to achieve sustainability in our life, this became a necessity. To achieve sustainability, products, processes and services should meet the challenges not only related to their functions and performance but also to environment, economy and social issues.
The need to preserve and efficiently use the world resources and reducing carbon emissions has lead to the eco-concept issue. It is an entire system we have to take into consideration, each part adding his contribution to the global sustainability.
This paper presents some aspects concerning the steps to follow in improving the hotel's sustainability performance.

Brief Biography of the Speaker: Badea Lepadatescu is currently an Associate Professor at the Faculty of Technological Engineering and Industrial Management of Transylvania University of Brasov, Romania. He obtained his doctoral degree in 1998 in the area of machining through superfinishing process. After he graduated he worked five years as design engineer at Roman truck factory in the field of manufacturing processes where he designed many devices and special machine tools especially for superfinishing process. Started on 1982 he worked as research engineer at Transilvania University of Brasov, and after 1997 he is teaching at Department of Manufacturing Engineering. His main academic interests include Tolerance and Dimensional Control, Manufacturing Engineering Processes, Automation Processes, and Renewable Energy Sources. The research accomplishments are reflected through publications in a five books and authored or co-authored over 120 papers published at international conferences. He has extensive experience in both experimental and theoretical research work having more than 50 contracts with factories to design and produce machine tools for machining processes. Also in the field of Renewable Energy Sources together with a team he made two wind turbines, one with horizontal axis for taking water, and one with vertical axis to produce electric energy. He has been speaker to international conferences, has moderated forums, organized symposia, workshops and sessions at major international conferences.

Plenary Lecture 3

The Case Study on Environmental Aspects Assessment of a Production Process

Professor Constantin Buzatu
Faculty of Technological Engineering
Manufacturing Technology Department
Transilvania University of Brasov
Romania
E-mail: cobuzatu@unitbv.ro

Abstract: In this paper we analyzed the aspects concerning the environmental factors assessment of a production process in accordance with ISO 14001:2005. The elaborated case study allows us to handle under control the significant environmental aspects related to the generated waste, as well as to ensure the accordance with legal requirements and other requirements for significant environmental aspects related to waste and should comply with established policy, objectives and targets in the field of environmental management.

Brief Biography of the Speaker: Constantin Buzatu is Professor at the Faculty of Technological Engineering and Manufacturing Technology Department of Transilvania University of Brasov, Romania. He graduated in 1972 and he obtained his Ph.D. in the field of accuracy of machining processes. His research interests are in Manufacturing engineering processes, Automation in industry, Performance measurement and management, Education technology. He is author and co-author of seven books and more than 150 papers in national and international conferences. Also he has been research manager for several research grants from Ministry of Education of Romania, and for contracts with factories in industry to introduce new technologies in producing workpieces and to improve their reliability. He was member of technical program committee of some conferences and chairman of local and international conferences. He has been scientific reviewer for International Conferences and independent evaluator for Grant National Competitions

Plenary Lecture 4

Recovery of Metals from Electronic Industry Wastes

Professor Hong Hocheng
co-author: Professor U. U. Jadhav
Department of Power Mechanical Engineering
National Tsing Hua University
Taiwan ROC
E-mail: hocheng@pme.nthu.edu.tw

Abstract: The rapid progress of electronic packaging technology is resulting in huge amount of electronic waste (E-Waste) particularly in the form of solders and printed circuit boards (PCBs). Such E-waste contains heavy metals. The recycling of such E-waste for recovery of the metals decreases the environmental impact by reducing the amount of waste and the need of mining the metals. Hence the E-waste can act as an important secondary source for heavy metals. Several promising hydrometallurgical and bio-hydrometallurgical processes were developed to recover the precious metals from E-waste. Environmental friendliness and cost effectiveness are among the merits of some processes. The effects of various process parameters on metal leaching were investigated. Use of large pieces of PCBs facilitated reusability of PCBs and avoided difficulties in metal purification.

Brief Biography of the Speaker: Professor Hong Hocheng earned his PhD from UC Berkeley in US and is now the Tsing Hua Chair Professor at National Tsing Hua University in Hsinchu, Taiwan. . He has published more than 150 journal papers and 40 patents in the area of manufacturing technology. His research interest lies in the new manufacturing processes. Recently he has made innovative research in achieving effective monitoring for nanoimprint and reclaim of heavy metals from industrial wastes by microbes. He has been cited Outstanding Teaching by NTHU for teaching the undergraduate required courses of Manufacturing Processes and Technology. Prof. Hocheng served as the editorial board member of more than 15 international journals. He received National Academic Prize from Ministry of Education and Outstanding Research Awards from National Science Council of Taiwan. Prof. Hocheng is internationally recognized by Prof. Fryderyk Staub Golden Owl Award from World Academy of Manufacturing and Materials Engineering.

Plenary Lecture 5

Main Features of Regional Climate Change and Its Impact on Environment on Example of the Territory of Georgia
On Some Specifics of the Regional Climate Change over the Territory of Georgia

Professor Teimuraz Davitashvili
I. Vekua Institute of Applied Mathematics
Tbilisi State University
Georgia
E-mail: temuri.davitashvili@viam.sci.tsu.ge

Abstract: The problem of the forthcoming global climate change resulting from natural and growing anthropogenic factors (much more economical and technological development, overexploitation of land, water, oil and gas resources) acquires a particular importance for the territory of Georgia. The geographic location of Georgia, its complex orography and circulation conditions specify the diversity of its climate. Here form 11 types of climates from semi-desert to subtropics. For example there were observed: mountainous zone of Caucasus with constant snow and glacier, wet subtropical climate of the Black Sea, continental climate of Eastern Georgia and semi desert climate in some regions of Eastern Georgia. As well on the background of the global climate warming the statistical processing of the data of mean climatic temperature for the last ninety years exposed the versatility of climate over the territory of Georgia. Namely there were observed regularity of the climate cooling in the West Georgia, warming in the East Georgia and also there were elicited those micro-regions where mean climatic temperature had not changed in time.
In this paper some characteristic features and aspects of the diversity of Georgian climate change (some reasons of regularity of climate cooling in western Georgia and beginning of the desertification processes in the eastern Georgia) are investigated. Some results of numerical simulation of the air flow dynamics in the troposphere over the Caucasus Mountains taking place in conditions of nonstationarity of large-scale undisturbed background flow based on numerical simulation are presented. Main features of the atmospheric currents changeability while air masses had been transferred from the Black Sea to the land's surface were investigated. It was shown that non-proportional warming of the Black Sea and Colkhi lowland provokes the intensive strengthening of circulation and effect of climate cooling in the western Georgia. The effects of thermal and advective-dynamic factors of the atmosphere on the changes of the Eastern Georgian climate were studied. Some results of the investigation connected to the beginning of the desertification processes in the eastern Georgia are presented. At present in modern glaciers of Georgia dominate the processes of the retreat and melting, sizes of large glaciers come apart into smaller ones, the volume and length of glaciers are reduced. Some results of investigation of Georgian's glaciers pollution and its melting process are given.

Brief Biography of the Speaker: Prof. Teimuraz Davitashvili holds a 5-year Diploma in Mathematics (specialization Hydro-air Mechanics) from Tbilisi State University (1972). In 1985 he received the Ph.D and in 1997 the Doctor of Physics and Mathematics upon the doctoral thesis " Numerical Modelling of Some Problems of Atmosphere Physics for Mountain Regions". Since 1972- researcher, senior researcher, head of department at I.Vekua Institute of Applied Mathematics of Tbilisi State University. From 1994 to 1998 an Associate Professor and from 1999 to 2006 a Full Professor of Tbilisi State University. From 2006 to 2013 head of department of Weather Forecast and Modelling of Natural and Anthropogenic Catastrophic Events at the Hydrometeorological Institute of Georgia. Currently head of laboratory of Mathematical Modelling and Numerical Analyses atTbilisi State University. He published 1 book, about 140 research papers in various scientific journals and international conference proceedings. His general research interests are: environment pollution, climate change, modeling in applied mathematics, simulation of non-ordinary events and weather forecast by numerical methods.

Plenary Lecture 6

Modern and Historic Structures' Failure Modes with Regards to Design Mistakes, Strength Depreciation, and Nature's Forces

Professor Ahmet Turer
Civil Engineering Department
Structural Mechanics Lab.
Middle East Technical University
TURKEY
Email: aturer@metu.edu.tr

Abstract: Building structures, regardless from being historic or contemporary, has always sought a basic balance between material capacity and effects of loads on the members. Recently engineer face challenges with longer spans, taller buildings, deeper excavations, but sometimes the most basic violated principles would cause collapses and human losses. Additional challenges are faced by natural disasters occurring more frequent and severe probably exceeding specifications and guidelines. This presentation discusses design principles and assumptions being violated by nature's forces, giving practical examples from observed collapses. Interesting case study collapses include millenniums old historic structures, early 20th century structures, and modern – new build structures. Emphasis will be given on how the damages occur and if they can be prevented. Strengthening techniques and basic interventions to overcome existing weaknesses and disadvantages will be discussed.

Brief Biography of the Speaker: Prof. Dr. Ahmet Turer is a full time faculty member in the Department of Civil Engineering in Middle East Technical University. He has completed his BS degree (1993) at METU, MS (1997) and PhD (2000) degrees at University of Cincinnati, Ohio, USA. Dr. Turer had worked in private sector in project management, structural engineering design and analysis areas in Turkey and USA. He is a faculty member at METU since 2000 with over 20 MS and PhD students graduated. Research interests are mostly on structural evaluation and strengthening of historic masonry and timber structures, bridges, structural health monitoring (SHM) and its applications, forensic and risk analysis, blast loading, artificial intelligence, earthquake performance of structures, analysis and programming. Dr. Turer has participated in international projects such as NATO-SfP, submitting proposals for EC, and has coordinated a Worldbank project; has been member of national and international organizations such as ICOMOS, ISCARSAH, IABMAS, and national scientific committees for Ministry of Culture. He has been PI of various national and private funded projects and large number of consultancy projects.

Plenary Lecture 7

Application of Electrokinetics in Remediation and Stabilization of Clays

Professor Dilek Turer
Department of Geological Engineering Department
Hacettepe University
TURKEY
E-mail: dturer@hacettepe.edu.tr

Abstract: Application of electrokinetics in remediation and stabilization of soils is a rather developing technology. In environmental practices, it has been shown that this technique is effective in cleaning of heavy metals, radionuclides and organic contaminants from polluted soils. It involves application of direct current to the soil between appropriately distributed electrodes. During the application, charged ions are transported towards oppositely charged electrode by electromigration due to applied current. At the same, pore water moves towards cathode by electroosmosis because of negative surface charge of the soil.This technique has also been applied in solving geotechnical problems such as increasing shear strength of soft soils. Application of electrokinetics has been favored over compaction, cementation, preloading procedures especially in locations, where existence of buildings interfere with the stabilization of soft soils. With this technique it is possible to achieve increase in strength of soil without causing disturbance in subsurface. In both environmental and geotechnical practices electrokinetics is especially suitable for low permeability clay soils. There is, however, one drawback in this technique and that is achievement of decontamination and stabilization in restricted areas of the soils. Decontamination is effective in areas close to anode with low pH conditions, while stabilization is effective in areas close to cathode with high pH conditions. New studies are focusing on solving this problem.
In this lecture, basics of electrokinetics and examples of both environmental and geotechnical applications of the technique carried out by the speaker will be presented.

Brief Biography of the Speaker: Assoc. Prof. Dr. D. Turer holds a bachelor degree in Geological Engineering from Middle East Technical University (TURKEY), MSc and PhD (2000) in Geology from the University of Cincinnati (USA). She has been a faculty member of Geological Engineering Department of Hacettepe University (TURKEY) since 2001. Her research interests include, stabilization/solidification technologies, heavy metal contamination of soils and environmental geology.