JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE
日本学術振興会

ABSTRACTS

OF

EGYPT - JAPAN MULTIDISCIPLINARY SCIENCE FORUM, "INNOVATIONS AND NEW CHALLENGES"

DATE: SATURDAY 24TH, MARCH 2018

VENUE: CONFERENCE CENTER, FACULTY OF SCIENCE, AL-AZHAR UNIVERSITY, CAIRO.

UNDER THE PATRONAGE OF

H.E. PROF. DR. MUHAMMAD HUSSEIN MAHRASAWI

PRESIDENT OF AL-AZHAR UNIVERSITY

DR. YUICHIRO ANZAI
PRESIDENT OF JAPN SOCIETY FOR THE PROMOTION OF SCIENCE

PARTNERS

九州大学
KYUSHU UNIVERSITY

AL-AZHAR UNIVERSITY

Program

*9:15- 10:00 **Registrations***

10:00-10:30 Opening Session

Convener (Prof. Dr. Safwat Hasaballah, AZU)

- Welcome speech from Al-Azhar university

  President of Al-Azhar University, Prof Dr. Mohamed Hussein Mahrasawi

  Vice- President of Al-Azhar University, Prof Dr. Tarek Salman

  Vice- President of Al-Azhar University, Prof Dr. Youssef Amer

  Director of International collaboration - Al-Azhar University, Dr. Ahmed Nabil
- JSPSAAE, Prof. Ibrahim Tantawy
- JSPS Cairo Research station: Prof. Naoko Fukami
- Deputy Ambassador of Japan in Egypt (TBC)

10:30- 11:30 Study and research in Japan Session:

Convener (Dr. Said Desouky, AZU)

-JSPS programs and JSPSAAE activities, Prof. Gad EL-Qady (NRIAG)

-MEXT scholarships Mr. Koji Kaneko (Embassy of Japan in Cairo)

-Study programs of Kyushu university- (KU -Cairo office)

11:30-12:00 Coffee Break

12:00-14:30 Hall (A) Biosciences and Biotechnology session

Convener: Prof. Abdel-Hamid Osman (SCU), Prof. Dr. Ahmed Darwish Elgamal (AZU)

1 Memories of Medical Collaboration between Egyptian Scientists and Kobe University, School of Medicine"

Prof Shigeaki Sato, Prof. Emeritus, Kobe University and former Director of the International Center for Medical Research, Kobe University School of Medicine, Kobe, Japan

2 Food-derived Bioactive Peptides: New Promises for Human Therapy

Prof. Hisham R. Ibrahim, Division of Molecular Functions of Food, Department of Biochemistry& Biotechnology, The Graduate School of Agricultural Sciences, Kagoshima University, Japan

3 Applications of Biotechnology Techniques in Agriculture and Industry

Prof. Dr. Hany A. El-Shemy, Ex-Dean and Director of Biotechnology Labs (FARP), Biochemistry Department, Faculty of Agriculture Cairo University

4 Genetically Modified Organisms (GMOs) in Egypt

Prof. Dr. Moemen Hanafy, Ambassador Scientist Alexander von Humboldt Foundation & Professor of Plant Biotechnology , National Research Centre (NRC), Cairo, Egypt

5 Microbes in Environmental Biotechnology and Alternative Energy

Prof. Dr. Mohamed Salah Azab, Professor of Environmental Sciences & Biotechnology, Faculty of Science, Al-Azhar University

12:00-14:30: Hall (B) Material Science session

Convener: Prof. Adel Nassar (MU), Prof. Dr. Alaaeldin Abdelhamied Bahgat(AZU)

1 Tunable, Earth-Abundant Nanostructured Materials for Efficient Solar Energy Conversion

Professor Nageh K. Allam, Energy Materials Laboratory, School of Sciences and Engineering, The American University in Cairo, New Cairo 11835

2 Development of Metal Oxide Nanoparticle-based Catalysts for Efficient Biodiesel Production

Professor Mohamed S. El-Deab, Department of Chemistry, Faculty of Science, Cairo University, Cairo, Egypt

3 New Generation of Metallic biomaterials

Associate Professor Mohamed Gepreel, Department of Materials Science and Engineering, School of Innovative Design, Egypt-Japan University of Science and Technology (E-JUST).

4 Corrosion and Surface Treatment of Magnesium Alloys

Associate Professor / Salah Salman, Mining and Petroleum Engineering Department, Al-Azhar University, Nasr City, Cairo, Egypt.

5 An over view on the unique properties of titanium alloys with low cost alloying elements

Dr. Mohamed Kamal, Mining and Petroleum Engineering Department, Al-Azhar University, Nasr City, Cairo, Egypt.

14:30-15:00 Hall (A) Summary and Closing remarks

Convener: Prof. Montaser EL Salmawy (SU), Prof. Hussain Sorour (KShU)

15:00-16:00 Lunch

Hall (A) 15:30-16:30 JSPSAAE Alumni Annual Meeting (Alumni members only)
Prof. Dr. Ibrahim Tantawy, Prof. Ahmed Saleh

Hall (B) 15:30-16:30 first Annual Meeting for Azhar-Japan association (members only)

ABSTRACTS

(A)

BIOSCIENCES AND BIOTECHNOLOGY

SESSION

Memories of Medical Collaboration between Egyptian Scientists and Kobe University, School of Medicine

Shigeaki Sato
Prof. Emeritus, Kobe University and former Director of the International Center for Medical Research, Kobe University School of Medicine, Kobe, Japan

Most of the scientific collaboration between Kobe University School of Medicine and foreign countries have been managed by the International Center for Medical Research (ICMR) and its succeeding facilities. ICMR was established in 1979 and its major activity was management of Core University System supported by JSPS. This collaboration was done mainly by scientist exchange between universities in Indonesia, the Philippines, Thailand, Singapore and Malaysia and those in Japan. Core University System also included holding international seminars in Japan and counterpart countries. The second activity supported by JSPS and managed by ICMR was Large-scale Cooperative Research Program aiming at the more practical cooperative research on tropical diseases and under this program Tropical Disease Research Center was established at Airlangga University in Surabaya, Indonesia. Dissertation PhD Program of JSPS was also one of the activities managed by ICMR. ICMR was later reorganized as International Center for Medical Research and Treatment in 2004 and again changed to Center for Infectious Diseases in 2009. By Core University System we could not invite scientists from other countries than the counterpart countries. For the invitation of scientists from other countries there has been Visiting Researcher System supported by the Ministry of Education, Science and Culture, Japan since 1975 and applied to ICMR and its succeeding facilities and those belonging to other Faculties. Mainly based on this system we have invited nine Egyptian scientists to the School of Medicine so far. The time of visit and research topic of each of them are introduced. Other than these scientists so far seven Egyptian graduate students came to our school and obtained PhD degree under the ordinary course. I have been to Ismailia, Cairo and Alexandria in 2002 and their impressions will be mentioned with some pictures.

Food-derived Bioactive Peptides: New Promises for Human Therapy

الببتيدات الحيوية المشتقة من الأغذية: آمال جديدة في العلاج البشري

Hisham R. IBRAHIM

Professor, Division of Molecular Functions of Food,
Department of Biochemistry & Biotechnology,
The Graduate School of Agricultural Sciences, Kagoshima University, Japan.

Food-derived bioactive peptides are increasingly becoming recognized as major food compounds for human health promotion by preventing the occurrence of chronic diseases through their impacts on the cardiovascular, immune, and nervous systems. New discoveries on bioactive peptides are important for the maintaining of human health and commercial development of the area of nutraceuticals and therapeutics. This talk will explore newly discovered food-derived bioactive peptides, which offer a fascinating opportunity for their therapeutic potential that will help fight the growing threat of leading killers of human diseases.

Genetically Modified Organisms (GMOs) In Egypt

Moemen S. Hanafy
Plant Biotechnology Department, National Research Centre (NRC), Egypt

There is a constant expectation for fast improvement of plant and animal production. The advent of recombinant DNA technology and the possibility of gene transfer between organisms have brought new dimensions in genetic modification to improve plant characteristics, livestock production and human health care products. Modern biotechnology has been developed to solve the problem of hunger and poverty in developing countries and improve the quality of life. In agriculture, genetically modified organisms (GMOs) are developed to possess several desirable traits such as resistance to pests, herbicides, unfavorable environmental conditions, improved product shelf life and increased nutritional quality. However, the recent advances in gene transfer, animal cloning, and assisted reproductive technologies have more or less fulfilled the expectation in livestock transgenesis. Nowadays, we can produce human insulin in microorganisms or spider silk protein in goat milk.

Egypt was one of the few countries to realize in 1980 the importance of GM crops in achieving sustainable agriculture (Assem, 2014). Technology transfer and building capacities for improvement of crop production using modern biotechnology started in early 1990s. In 2008, Egypt approved the cultivation and commercialization Bt-corn variety (called Ajeeb-YG) after several years of testing under greenhouse condition and in field trials. To our knowledge, this is the first legal introduction of GM crops into the country. Due to an aggressive media campaign against GMOs, the former Ministry of Agriculture issued a decree in March 2012 to suspend the planting and commercialization of the yellow corn variety Ajeeb-YG. An overview of the current status of the GMOs in relation to the production, benefits, associated risks and regulatory framework in Egypt will be will be presented. Also, the constraints in commercialization of the GM crops and the opportunities for adoption of GM products in the Egyptian market will be discussed.

Microbes in Environmental Biotechnology and Alternative Energy

Prof. Dr. Mohamed Salah Azab,
Professor of Environmental Sciences & Biotechnology,
Faculty of Science, Al-Azhar University

Mission of scientist to deal with numerous issues to sustain or even improve the general quality of life of the 7 billion people that currently inhabit the earth. Several urgent needs in the context of the water–energy– food nexus will become more prominent in the next decades. It is crucial to delineate these challenges and to find opportunities for innovative microbial technologies in the framework of sustainability. Presentation will focus on coming key issues; the contribution of microbial biotechnology to sustainable development goals, microbial biotechnology applications for production of protein as food and feed, upgrading of CO2 to microbial bio-products and Microbial innovations related to alternative energy.

(B)

MATERIAL SCIENCE SESSION

Tunable, Earth-Abundant Nanostructured Materials for Efficient Solar Energy Conversion

Nageh K. Allam
Energy Materials Laboratory, School of Sciences and Engineering,
The American University in Cairo, New Cairo 11835

If solar energy is to become a practical alternative to fossil fuels, we must have efficient ways to convert photons into electricity, fuel, and heat. To this end, direct solar energy conversion to storable fuels offers a promising route toward less reliance on fossil fuels. The development of a successful solar-fuel-generation technology would require the invention of new photoactive materials that accomplish the combined tasks of light harvesting, charge separation, and compartmentalized chemical transformations. One of the most critical issues is the development of a suitable semiconductor photoanode with high efficiency and long-term durability in aqueous environments. In addition, the lack of effective oxidation and reduction catalysts is among the most serious obstacles preventing the development of an efficient and scalable artificial fuel generator. In this regard, nanoscience can make a difference. This talk will cover the assembly and development of new semiconductor nanoarchitectures as well as interface control for the purpose of solar energy conversion in general and direct solar-to-chemical energy conversion in particular.

Development of Metal Oxide Nanoparticle-based Catalysts for Efficient Biodiesel Production

Mohamed S. El-Deab*, Hosam H. Abdelhady, Doha M. Sayed, B. E. El-Anadouli

Department of Chemistry, Faculty of Science, Cairo University, Cairo, Egypt

Biodiesel is an important alternative fuel in energy production to meet the growing needs for energy in developing and developed countries. Biodiesel is an environmentally friendly fuel that can be used directly in diesel engine, offering high efficiency. Esterification and Transesterification are by far the most frequently used methods for the transformation of Fatty acids or triglycerides feedstocks to biodiesel. The rate of esterification (transesterification) reaction is accelerated using a catalytic material (e.g. NaOH and H2SO4).

The use of heterogeneous catalysts is proposed instead of the use homogeneous catalysts to overcome the drawbacks of the latter in terms of separation and soap formation which hinder the overall process.

In this study, the use of mixed metal oxide nanoparticles as heterogeneous catalysts for the transesterification (esterification) of oil (Fatty acid) into biodiesel is proposed. The effects of various experimental parameters; including methanol: oil (Fatty acid) molar ratio, catalyst loading level, reaction temperature and time of the reaction on the biodiesel yield are investigated.

Keywords: Biodiesel; metal oxide nanoparticles; transesterification; esterification.

New generation of Metallic Biomaterials

Mohamed Abdel-Hady GEPREEL

Department of Materials Science and Engineering,
Egypt-Japan University of Science and Technology (E-JUST),
Alexandria, 21934, Egypt.

Design of new low-cost alloys with high biocompatibility for implant applications is now a challenge. To meet the demands of longer human life and implantation in younger patients, the development of novel metallic alloys for biomedical applications is aiming at providing structural materials with excellent chemical, mechanical and biological biocompatibility. It is, therefore, likely that the next generation of structural materials for replacing hard human tissue would be of those alloys that don't contain any of the cytotoxic elements, elements suspected of causing neurological disorders or elements that have allergic effect. Besides the other mechanical properties, the low Young's modulus alloys take a special attention recently in order to avoid the occurrence of stress shielding after implantation. Therefore, many alloys were developed consisting of biocompatible elements such as Ti, Zr, Nb, Mo, and Ta and show excellent mechanical properties including low Young's modulus. However, a recent attention was directed towards the development of low cost-alloys that have a minimum amount of the high cost rare-earth elements such as Ta, Nb, Mo, and W. This comes with substituting these metals with the common low cost and biocompatible metals such as Fe, Mn, Sn, and Si, while keeping excellent mechanical properties without deterioration. Therefore, the investigation of mechanical and biological biocompatibility of those low-cost alloys is highly recommended now to guide for a commercial alloys with excellent biocompatibility for long-term implantation.

Key words: implants, compatibility, long-term implantation, Ti-alloys, low-cost implants

Corrosion and Surface Treatment of Magnesium Alloys

S. A. Salman
Mining and Petroleum Engineering Department, Faculty of Engineering,
Al-Azhar University, Nasr City, Cairo, Egypt.

Magnesium alloys have been attractive to designers in various industries due to their low density, high strength-to-weight ratio, high dimensional stability, good machinability, and ability to be recycled. These properties make magnesium alloys an attractive target in a number of applications, especially in the fields where weight reduction is required. Among these applications, automobiles, computer parts, mobile phones, sporting goods, hand-held tools, household equipment and aerospace components. Magnesium alloys could also contribute towards meeting future requirements of the automotive industry to make cars lighter and thus improve fuel efficiency and reduce emissions, as the use of magnesium alloys would significantly decrease the weight of automobiles without sacrificing structural strength.

In spite of these good characteristics, there are some major limitations of magnesium alloys due to the poor corrosion resistance and the extremely negative equilibrium potential.

Various surface treatments have been developed for the protection of magnesium alloys against corrosion. Electrochemical plating, conversion coating, anodizing, ceramic coating, organic coating, gas-phase deposition, and laser surface alloying are among the most common surface treatments applied to magnesium alloys

Of these, conversion coating and anodizing are economically and environment-friendly surface treatments; they are easy to use and offer various valuable surface properties.

Figure 1 presents the wet processes most widely and commercially used surface treatment of magnesium alloys in terms of film thickness and the film-formation rate.

In our recent research, anodizing and conversion coating were carried

out in various conditions. Furthermore, post treatments such as sealing and Self-assembled monolayers (SAM) were applied to provide more protection against corrosion.

The corrosion property of AZ31 magnesium alloy was improved with anodizing and conversion coating and more protection was achieved by post-treatments processes

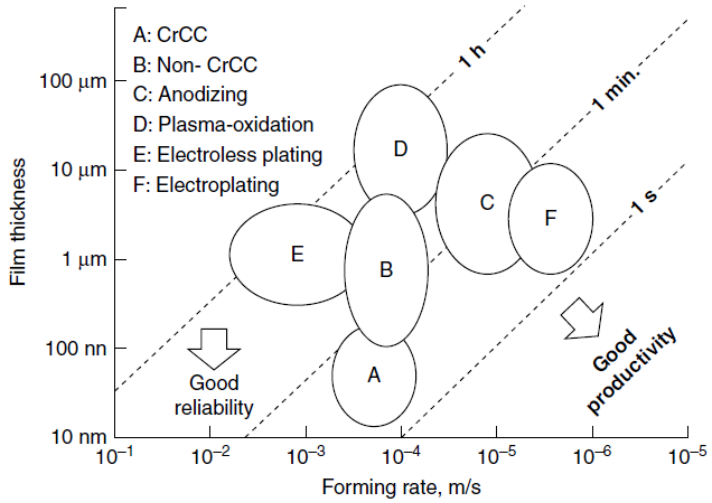

Figure 1: Film thickness on magnesium alloys produced by various wet processes as a function of the film-formation rate.

An over view on the unique properties of titanium alloys with low cost alloying elements

Mohammed K. Gouda
Mining and Petroleum Engineering Department, Faculty of Engineering,
Al-Azhar University,Nasr City, Cairo, Egypt.

Titanium and its alloys are very important metallic materials, their remarkable properties such as high strength-to-weight ratio, corrosion resistance, and biocompatibility make titanium alloys the proper candidate for many applications. The usage of titanium alloys in more applications is quite limited because of the

higher cost of titanium alloying production whether cost of alloying elements (such as Vanadium, Tantalum, etc…,) or the cost of following processes (heat treating, machining, etc…,). Therefore, the new trend is to apply cost reduction for titanium alloys. This could be achieved through the development of titanium alloys with their unique properties using low cost elements instead of the high cost ones. Additionally, cost reduction whether in the production or in the subsequent processes will increase using titanium in more applications.

Recently, development of good mechanical properties of β-titanium alloys currently attracting considerable research attention. The increase in demand for ultra-high strength materials gives the opportunity for β-titanium to be advantageous over other materials due to its higher specific strength. Moreover, during the development of ultra-high strength titanium alloys, a dramatic change in the cold workability of a series of Ti-Mn alloys is interestingly noticed. The cold workability is drastically changed from poor at low Mn-content alloys to excellent at higher ones and drops again at much higher Mn-content alloys. Furthermore, Tensile test results showed high strength at low Mn-content and ultra-high strength of about 1950 MPa at high Mn-content alloys after cold deformation.

Table 1. Values of plastic strain (%) and ultimate tensile strength (MPa) of 90% cold rolled Ti-Mn alloys

Sample name	Plastic Strain (%)	UTS (MPa)
10Mn	0.90	1790
12Mn	0.88	1860
14Mn	1.35	**1945**
16Mn	1.07	1893

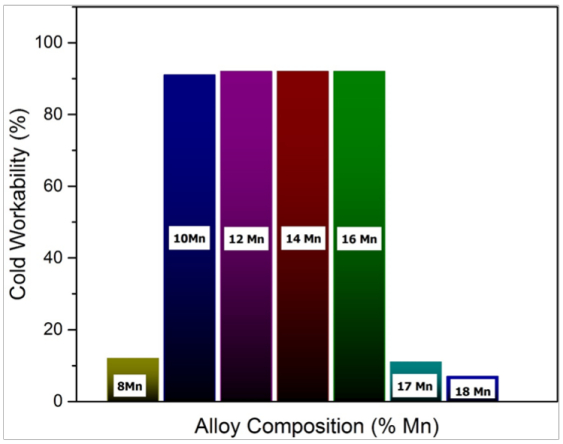

Fig. 1 Cold workability change with Mn-content in binary Ti-Mn alloys (measured from the maximum reduction in thickness by cold rolling without the appearance of major cracks)

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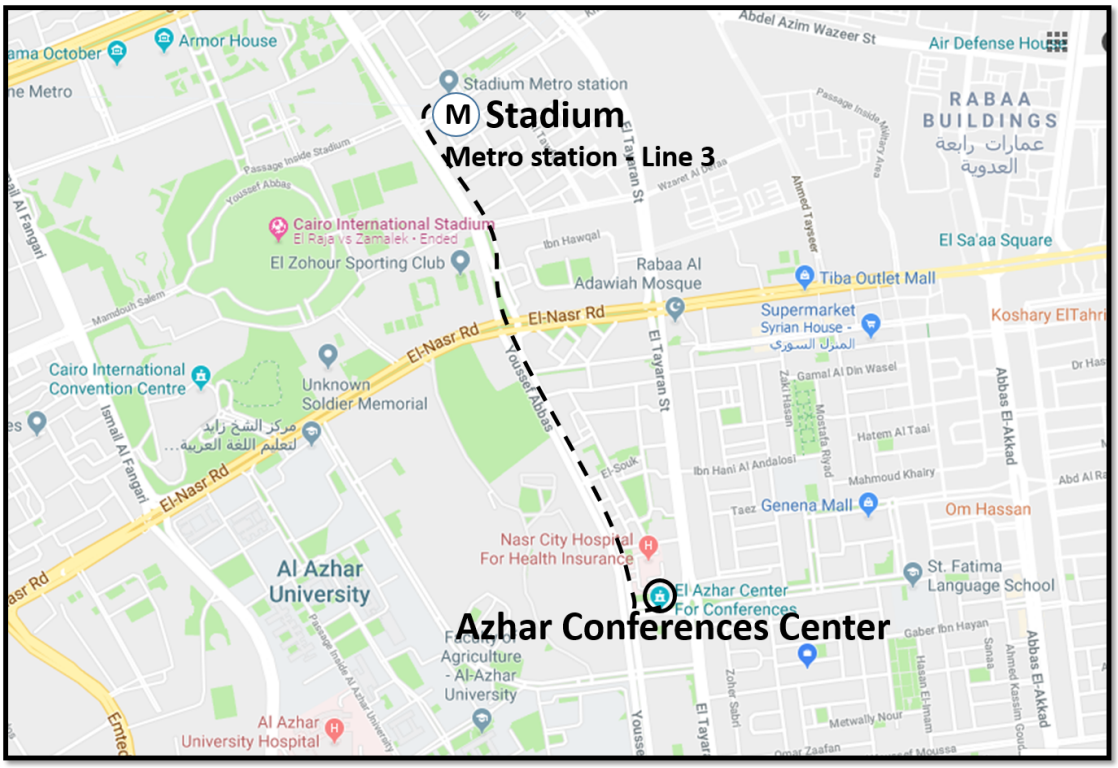

Google map shows access to Azhar Conferences Center (ACC)

(Ismail El Qabbany St. Off El Tayaran St., Nasr city, Cairo Beside Nasr City Health)

(https://goo.gl/maps/7cYA6b5FwQS2)

By Car: through El-Nasr road, then turn to Youssef Abbas St.

By Subway: use subway No. 3 to Stadium St. then you may use taxi for 5-10 minutes or by waking for 15 minutes.

For more details, contact:

Dr. Said Desouky

Associate Professor of Biotechnology

Faculty of Science, Al-Azhar University

Kyushu University, Japan, PhD

dr_saidesouky@yahoo.com

+2-010-2557-7819