Dr Alireza Jahangirian: In terms of nanotechnology, Islamic Republic of Iran holds the first place in the Islamic world and region and ranks 25th in the world. Ministry of Science, Research and Technology shares 90 percent of the programs and published articles evaluated by the President Headquarter of Technology Development.



Dr Teguh Rahardjo: We are interested in collaboration in the fields of solar cells, wind energy, environmental protection, nanotechnology and PhD studies and we are able to offer scholarships to the qualified students.



News

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Latest News

Nanotechnology Ceremony

The latest scientific and research achievements of MERC were demonstrated to the public in the MERC's stall in the ceremony of Special Headquarter for Development of Nanotechnology. This ceremony was held on Wednesday 4 November to Sunday 8 November 2009 in the Imam Khomeini (peace upon him) Mosalla of Tehran.

To be continued in the next issue

Second Round of Scientific and Technical Collaboration between Iran and Indonesia



By invitation of Dr Dr Teguh Rahardjo (Deputy Minister for Research and Technology of Indonesia), the second round of scientific and technical collaboration between Iran and Indonesia was held in Jakarta. In this round which was held with attendance of the Iranian delegate, headed by Dr Alireza Jahangirian (Deputy Minister of Ministry of Science, Research and Technology of Iran) and accompanied by representatives of the Ministry of Health and Medical Education, heads of research centers of Aerospace, Genetics, Seismology, MERC and Deputy of Scientific and International Collaboration Center of the responsible ministries and the Indonesian authorities, 6 collaborative documents between the Ministry of Science, Research and Technology of IR of Iran and Ministry of Research and Technology of the Republic of Indonesia and counterpart centers of the two countries were prepared and signed.

Continued on page 4

ISO I-E-C 17025

A feasibility session for the implementation of ISO I-E-C standard 17025 was held in MERC by the representative of DAP Company of Germany on Monday, 19 October 2009. In this session, the advantages of the implementation of this standard were explained and the executives were asked to implement the described principals as the priority of their work.

Training Workshop "Familiarization with AFM Instrument"



This workshop was held in MERC by Daneshyar Kavosh Company with the attendance of 64 members of academic, general staff and students on Monday, 12 October 2009. Dr Rahmanian and Mr. Zarrin Khameneh presented the theoretical aspects and capabilities of portable AFM.

Liaison with Industries

The student projects that are in line with solving industrial problems of the country will be financially supported.

Continued on page 3

Introducing the 20

The introduction ceremony of master students o
was held on Monday, 5 October 2009 in pre
Director and the Deputies of the MERC.



Following recitation of verses from the holy Qura
Sadrnezhaad (the Director of MERC) we
congratulated new students for entering
described studying at MERC as «a golden op
learning and research». He explained «the
MERC» being «scientific research», while
cultural and religious activities are also th
prophecies of MERC. He declared that in 2008,
per-capita number of scientific articles in MERC
7 and 8 and the number of recorded per-capi
and applied projects were at an excellent l
understanding, the levels of inventions and rese
in MERC are amongst the top most ones in the
even higher than many credible universities
Sadrnezhaad mentioned that many of the PhD
MERC have ~4 to 5 ISI articles when graduatin
at high-level educational centers, this numbe
achieve. He also elaborated that MERC expecta
new students is to perform their role i
advancement» and «technology developmen
hoped that, by god's will, all students can defen
at graduation, fruitfully. The director of MERC de
master students choose their thesis themes a
soon as possible, «in order to be able to utilize
time of studying in the best way and to achie
results». He continued mentioning the quest for
the MERC's 5-year program and referred t
developments: «in less than one year, three new
were established and several modern equip
installed in MERC». Preparation of primary n
equipments have been updated by considerable
young engineers, my colleagues serving in n
«Orders and Equipments» and the aid of hard
sincere people who have solved all problems r
foreign sanctions. They rectified all problems ar

Solar Heating and Cooling

Presentation of Scientific Seminars and Project Reports

1. Mr. Mojtaba Naghavi DashtBaiaz defended his Master thesis entitled "Fabrication of antibacterial coating using copper and silver nano particles" on 13 September 2009. In this project antibacterial coating was manufactured by two methods: luster coating and optical coating of silver on a titanium oxide layer and after optimization of surface and superficial properties, its antibacterial characteristic against E. Coli and Staphylococcus epidermis were investigated. An appropriate antibacterial characteristic was obtained in both methods and the effect of different variables on this characteristic was investigated and it was revealed that those samples that produced with the second method have better antibacterial characteristics.



2. Mr. Abulfazl Mohammadi Ashnari defended his master thesis entitled "Fabrication and investigation of mechanical properties of sintered bioactive glass" on 14 September 2009. The 45S5 bioactive glass is a material based on silicate glass that is used to repair defects in the hard tissues such as bones. To date, different methods were employed for the creation of large size pores in this type of glass. In this research, after preparation of glass by sintering method, the obtained product was ground to powder together with different amounts of calcium carbonate and carbon black and was compressed under low pressure to make tablets. Following the heat treatment, the samples rendered porous. By employing this method, about 60% of pores with 60 micrometers dimension were created in the glass. Heat treatment for making pores resulted in crystallization of glass, but it had no effect on its bioactivity.



3. Mr. Sayyed Ebrahim Hashemi Amiri defended his master thesis entitled "Synthesis of nucleus membrane -nano particles of cobalt oxide/zinc oxide" on 21 September 2009. The objective of this synthesis was to produce cobalt oxide nano-particles inside a zinc oxide membrane. The nucleus of this nano-composite is a ferromagnetic substance, and zinc oxide is a semiconductor with high energy GAF, that has numerous applications. Therefore, the synthesized substance has both properties simultaneously. In this research, the cobalt oxide nucleus was prepared by hydrothermal method, the membrane nucleus sample was prepared by sol-gel method and finally the magnetic properties of synthesized samples were determined.



4. Ms. Zahra Gholamvand defended her master thesis entitled "Fabrication of self-cleaning filters from electrospinning carbon nano-fibers containing TiO2 nano-particles and investigation of its photocatalytic properties" on 21 September 2009. The objective of this project was to combine the absorption properties of carbon fiber with photocatalytic property of titania nano-particles in order to overcome the problem of titania low decomposition yield in the low concentration of pollutant, preparing an appropriate and retrievable substrate without filter requirement for stabilizing titania nano-particles and also overcoming the blockage problem of carbon absorbent filters by mean of photocatalytic decomposition of the absorbed pollutant. For this purpose, polyacrylonitrile (PAN) nano-fiber with different weight percentage of titania nano-particles substance was made by electrospinning method. PAN nano-fibers were carbonized during an appropriate heat treatment. It is worth mentioning that to investigate the absorbance capability of carbon and polymer nano-fiber surface towards titania nano-particles, coating on nano-fibers were performed by TiO2 sol. The properties of the produced composite micro-layers were investigated by EDX, FTIR, Contact Angle, Raman, SEM, BET and AFM. Finally, photocatalytic properties of the products were investigated by pollutant decomposition in gas and liquid environment.



5. Mr. Abdolrasoul Ghanbari defended his master thesis entitled "Effect of simultaneous employment of aluminum oxide and zinc oxide (Al_2O_3 & ZnO) nano-particles on improvement of adhering and anti-corrosive properties of epoxy coatings" on 28 September 2009. In this project, protective properties of epoxy coating containing both zinc oxide and aluminum oxide on St44-3G steel sheet specimen substrate were investigated by standard methods of testing for its cross cut adhesion, conic rigidity, conic bending, concavity, direct hit, resistance to sand spray, resistance



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Articles

Plasma Spray Workshop

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Among the visitors of the Plasma Spray Workshop, we may mention the managers of Manufacturing Technology Arrangement Engineering, Production Engineering, the Accessories project and Air Industries Motor Coating Workshops Site, Shafizadeh Industry, Ceram Sazeh Pouya Company, Submarine Technology and Science University Complex, Steel Research Institute, Paint Industry Research Institute, Niroo Research Center, Shahid Bagheri Industry, Metalurgy Engineering, Manufacturing and Equipment of Arak Machinery, Jihad Engineering Research Institute, Parto Company, Razi Research Center, Maham Research Institute, Parchin Industry, Khorasan Technology and Science Park, Tessa Company, Industrial and Scientific Research Organization of Technology and Science Park of Tabriz.



Plasma spray is one of the thermal spray processes that due to the intrinsic property of plasma flame, is capable of creating many types of coatings such as metal, alloy, composite, cermet, carbide and ceramic on different substrates. In the MERC workshop system, we use one of the argon, nitrogen, hydrogen and helium gases which are compatible with the characteristics of the coating materials feedstock. Plasma gas transfers the high-temperature generated by arc to the feedstock particles which results in the melting of these particles. These molten particles, due to the high speed of plasma gas, collide onto the substrate with a velocity of about 500 m/s and form the desired coating. Plasma gas mixture, in addition to its high temperature, due to its sufficient density for acceleration of the molten powder particles forms condensed coating with high adherence and high bond strength. High repeatability of the coating process in our system is due to the controllability of parameters such as voltage, ampere, feedstock powder rate and the distance of the spray gun, and makes it possible to fabricate coatings with qualities comparable to those of credible standard level. Fabrication of vast range of coatings is therefore performed in MERC, from those which are resistant to all kind of erosion (scratch, adhering, swinging etc) to the coatings which are resistant to corrosion (high temperature, ambient temperature, corrosive atmospheres) and many other coatings applicable to the various industries.

During last year, in addition to the technical visits, many works have been conducted in this workshop including: coating steel specimens with alloy MCrAlY, ceramics YSZ, alumina and titanium dioxide and performing hot erosion test with alumina particles on those surfaces and performed some coating on the students and research work specimens. The most distinctive research activities and services of the workshop had been creation of thermal insulating coating (TBC), produced according to the military standards which could resist up to 1200 ºC on the pieces and samples sent to the workshop. The acquired experiences and successes in the case of the above coatings, made MERC as distinguished as one of the credible centers in our country for creating TBC coatings. MERC's tendency for extending its activities in the field of thermal spray coatings and being leader in this field as a research and service providing complex encouraged us to promote our work to robotic systems and preparing a modern thermal spray system in the workshop's plan for the future course of actions.



Sustainable Architecture with New Approach to the Revision of Consumption Patterns in the Construction Industry

Continued from page 1:

Today, fundamental attention to sustainable progress in culture creation and equipping the individuals in the society with the environmental knowledge and the long term view of the authorities is essential. The view that its weakness caused on one hand, neglecting planning and investment in the field of environmental protection, and on the other hand industrialization of today's society and

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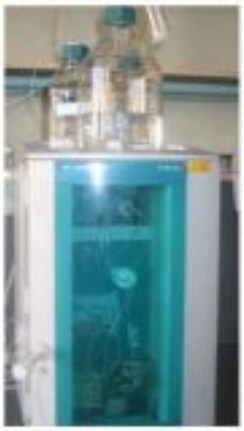
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Installing new Instruments

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3. Ion Chromatography (IC) Instrument: Chromatography is a common term for a wide range of physicochemical separation steps. In this process, separation is carried out by stationary and mobile phases. The mobile phase is a liquid and the stationary phase is a solid material. The mobile phase carries the substance in question, alongside the stationary phase. Ion chromatography is a useful method for separation of ions and polar molecules on the basis of their charges. The chromatography instrument functions on the basis of the latter principals and is able to determine (NH_4, Na, Li, K, Ca, Mg) cations and (F, Cl, NO_2, Br, NO_3, SO_4, PO_4) anions in aqueous solutions with high detection limit and the least time compared to wet chemistry.



4. Optical Microscope (Olympus Bx61): this microscope is capable of taking photos and videos of samples .The sample observation is performed in two ways; transmission and reflection. Photography for different samples carries out with 50, 100, 200, 500 and 1000 magnification and with a resolution of 0.01 micrometer. The instrument software is also capable of phase analysis for metallurgical biological researches.



5. BET Instrument: This instrument is capab determination of specific area of materials in the r (up to 0.01 m^2/gr). Using this instrument, we investigate the adsorption and desorption of nitrogen gas in a wide range of pressure. Determination of pores distribution curves in the range of 0.35 to 200 nanometer by using the BJH, MP and other methods is amongst the other capabilities of this instrumen measurement of specific area by BET met preparation of samples has an important effect o test results. In the preparation step, the sample is he to lose adsorbed pollutants. The device used fo purpose can heat the sample up to 430 °C. possibility of making vacuum during heating process also help better sample preparation.



BET



preparation of sam instrument

These instruments are located in MERC and ready to help research development by accep orders from both within and out of MERC.

PRESENCE OF MERC IN INTERNATIONAL SCENES

Second Round of Scientific and Technical Collaboration between Iran and Indonesia

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Achievements of the Session:

1. Signing memorandum of understanding of the Second Committee of Scientific and Technology Working Group of IR of Iran and Indonesia.
2. Signing memorandum of understanding for cooperation in geology and seismology



sensors. In this year's conference, which was held in university of Luzern Switzerland, Reza Mahmoodi a M student presented a paper entitled **"Fabrication o sensors with aid of electrical current"**. In this res he has demonstrated that it is possible to orien deposit one dimensional zinc oxide nano-structur electrophoresis method and apply these depo particles for the use in carbon monoxide gas sensors.

International Conference on Nanoscience Electro and Photonics

Nanoscience, Electronics and Photonics International Conference was held in Naarden, Netherlands, on

