

Dr Kamran Daneshjoo: Universities should be Islamic, it does not mean that all should study theology, but academic staff and students should attend classrooms with the viewpoint that **why they are created?** Afterward, science would be a tool for ascendancy and completion of human beings, not a tool for domination.

Dr Mohammad Mehdi Zahedi: The Howzah and university are the two powerful organizations for bringing the society to the gateway of new civilization of Islamic Iran and this ideal would not be possible except through a university that teaches such civilization.



News

Number 15, Augus

We congratulate esteemed academics and students on the commencement of the month of Mehr and the beginning of the new academ

Latest News

Inauguration ceremony of the Minister of Science, Research and Technology of the 10th cabinet

The ceremony for introducing Dr Kamran Daneshjoo and farewell to Dr Mohammad Mehdi Zahedi was held in presence of a large gathering of authorities, managers, heads and scientific and cultural officers and university dignitaries in Abureyhaan Theatre of Shaheed Beheshti University on Tuesday, 8 September 2009.

International Quds Day

To enunciate their support for the oppressed people of Palestinian and express their antipathy to the Zionist occupiers of Palestine, on the last Friday of blessed month of Ramadhan, 18 September 2009, members of MERC along with other ranks of the Iranian nation, attended with enthusiasm a demonstration in the Shohada Square of Karaj and streets surrounding the University of Tehran.

Holy defense week



For remembrance of the eight-years epics-of-belief, altruism, jihad and martyrdom, the armed forces and other brigades and units held a parade, in the participation of a numbers of Baseej corps and MERC staff, between Imam Khomeini (ra) Square and Fajr Square in Karaj on 22 September 2009.

PhD entrance examination

The 20th round of written examination for entering PhD program in the field of materials engineering at the MERC was held in the Tehran postgraduate office with participation of 71 applicants on Friday 14th August 2009. Amongst the successful participants in the first phase, 13 applicants were invited for the academic interview on 27 and 28 September 2009. The final results will be announced later.

Registration of 2009 entry students

Sanjesh organization of Iran (evaluating students for entrance to universities), introduced 45 applicants to MERC to be registered for MSc Degree in September 2009. The postgraduate office registered 17 applicants in ceramics, 15 applicants in nano-materials and 11 applicants in renewable energies on 6the September 2009.

Four applicants passed comprehensive written examination

Postgraduate committee announced Ms. Leila Nikzad, Ms. Fatemeh Saadaat Turknick, Mr. Mohammad Farvizi and Mr. Mohammadreza Akbarpour as successful candidates taking the comprehensive written examination of 27 and 28 July 2009 for PhD studies in materials engineering. They had entered the MERC for their graduate studies at 2007.

The MERC was named amongst 10 top national centers

In the 7th round of the laboratory evaluation, MERC was placed in the ten top centers holding the membership of the national nano-network.

Intellectuals' intimate meeting with supreme leader of the Islamic revolution

A number of academic staff, elites and chancellors of universities and research centers met with the supreme leader of the Islamic revolution on Sunday, 30the August 2009. The honorable Ayatollah Khamenei emphasized the necessity of fully endeavoring the expansion of the spirituality and immaterialism environment in universities.

Imam Reza (PBUH) says: Ali, the leader of belie
Fitre and the night of mid Shabaan. In these nig
pen

The Eftar (fast-breaking) feast in th

In the Eftar feast hosted by the director of M MERC restaurant on Monday, 14th Septembe attendance of a great number of academics, a staff and students, commencing with congrega led by Hajj Hassan Teimouri and followed by f Professor S.K. Sadrnezhaad explained the impo luminous nights of Ghadr and the relationships b science, guidance and the purpose of the creat of human beings. He added: "Allah is the light and the earth" and scientific research for earnin is an attempt to receive a beam of this outranc "light over light" which if it is accompanied wi worship, could enlighten the life path for humar could be our guide (Imam) to our lost spirit in t and rough night "their light will run before the Tahrim a part of Verse 8). He also said: "the purity the main provision of any work". Research knowledge with benevolent intention and for Go is a worship by itself. Whatever we conduct as work should be in the direction of imp immaterialism, spirituality and being closer to the He continued on philosophy of the human creati "One who is pure and pious and desires to be God (i.e. the source of light), could improve his reach the extent of God visage. The main goal "devotion" that causes closeness to Allah. M



reached knowledge from God) by Allah. Th happened t graceful Mohammad upon him) w going to schoo received the directly from t was due toh righteous worship. W created the human, taught him words, then he angels to prostrate to the man. They said that th being of annihilation; while the angles w worshiping the God without disobedience. God man knew something (words) that they did not Adam (PBUH) the words, but since there is a t

The Feasibility Study of Rhen

Rhenium (Re) is the rarest element in the eart superb properties, Re has been widely used industries such as petroleum, petrochemi

Two Master Projects

1. Axial collector under vacuum equipped with solar tracing system:

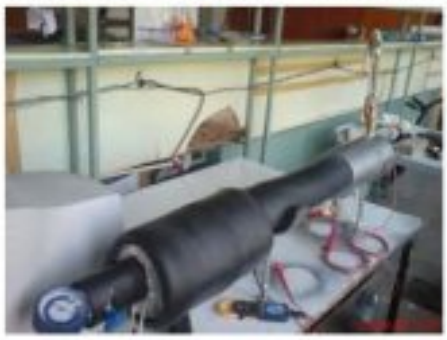
Axial solar collector under vacuum equipped with solar tracer was constructed in MERC. Construction of this collector was the subject of a master project of Farhad Eliasi Raad of Islamic Azad University, Takestan Unit under the supervision of Dr Kamal Abbaspour Sani; it was conducted in MERC. This collector that is called Glass-Metal Collector, is like a coaxial two-tube heat exchanger with the inner metal tube where the liquid is flowing and an outer glass tube. In order to reduce heat transfer due to movement, the air between two tubes is evacuated. The exchanger is designed for absorbance of sunlight by each tube individually if the slope is right. The absorbance of the sunlight by the two tubes is possible even if the instrument is in its horizontal position. The heat exchanger works as a thermosiphon (by natural convection) where the flow of hot liquid inside the collector is due to the difference in density of the hot and cold liquid, so the flow of hot liquid inside the collector heats the water in the tank. This is not only to diminish the cost of construction, water pumping and system preservation, but also in this type of collector, due to the focus of sunlight on the axis of outlet pipes, the water temperature is much higher than those with conventional flat solar collector. Therefore, the water temperature reaches around 90-100 °C at noon whereas water temperature in the flat solar collector seldom reaches 60 °C. Another advantage of this collector, compared to the fixed collectors, is its maximum light energy absorbance during working hour due to the presence of the solar tracer connected to it. So that the light angel with the collector surface reaches its minimum, which in turn increases the effectiveness of absorbance of the light energy and consequently increases the system performance. The solar tracer system of this collector consists of a photovoltaic cell, a source of collecting energy, a couple of light sensor, controlling circuit and an inducer system with a reducing gearbox.



2. Testing heat pipe instrument with capability of investigating different liquid

The testing heat pipe with capability of investigating thermo physical properties of different liquids is constructed in MERC. Construction of this instrument was part of a master project of Engineer Ramin Hajian under Dr Kamal Abbaspour Sani and Dr Mohammad Laiegh supervisions. This instrument consists of three main sections, heat pipe, heat source and condenser.

Actually, the heat pipe of this instrument is a trial sample of a similar heat pipe, which has been employed in industrial heat exchangers. Heat pipe is a heat exchanger with high yield and due to this property it is considered as a super conductor and the latent heat of the surface is transferred from heat source to cold source. Inside the pipe wall, there is a wick typically perforated and its surface is covered with a thin layer of the fluid. Its role is to exert a capillary pressure on the liquid phase to facilitate its movement to the hot end of the tube. Due to the existing vacuum inside the tube, when liquid enters the tube, there is a saturated state and vapor-liquid equilibrium. With heating up one end of the tube (vapor region) more liquid evaporates, density and vapor pressure in this region will rise and the difference between vapor pressures of two ends of the tube drives vapors to the condensing end of the tube where the vapor will lose its latent heat and changes to liquid and through the wick flows back to the hot end of the tube (vapor region). Two ends of the heat pipe equipped with lid and vacuum tap for liquid injection and connection to the vacuum pump. The heat source consists of a number of heat elements which could provide 600 W heat for the test. For the maximum usage of produced heat, heat elements are insulated by asbestos and insulating polymer. Condense section is actually a heat exchanger that its role is to coo down the heat pipe and absorb the heat from it. This hea exchanger is equipped with polyurethane insulator. The inlet to this exchanger is tap water and its flow rate is determined by flowmeter connected to the outlet of the exchanger. The temperature of input and output water is determined by two thermocouples. The distance between heat element and condenser is called adiabatic region and has been insulated to prevent heat transfer. To observe heat distribution on the heat pipe and calculation of its yield, under the insulation and on the tube, installed Pt 100 thermometers that a data logger collects their output in a computer. It is worth mentioning, this instrument provides us with a mean to test and investigate the behavior (or properties) of different liquids including nano liquids in the heat pipe. Also, with a bit o modification it can be used for acidic liquids.



MERC achievements in Tajikistan international conference

Continued from previous Newsletter:

In the previous Newsletter, we mentioned some of the accomplishments and memorandum of understandings as the outcomes of the Russia Minister regarding preparation of aluminum billets from the ore extraction to production and Dr Rostam Jaleelof a member of academic staff of electrical



Materials and Energy Research Center

Newsletter

Articles

Seminar and project presentation by students

1. Engineer Seyyed Hamed Abutalebi defended his Master thesis entitled "Fabrication of carbon fiber-reinforced polymer nano composite and investigation of its mechanical properties" on 1 August 2009. In this research, primarily, carbon nano fibers were produced by heat treatment of electrospinning PAN fibers, this was used as reinforcing phase in the production of electrospinning composite PAN fibers reinforced with carbon nano fibers. Next, the produced carbon nano fibers were used to reinforce PAN fibers. Then the mechanical properties of the two composite fiber products were investigated and compared.



2. Engineer Hossein Esmaeeli defended his Master thesis entitled "Production of pre-constructed spongy concrete using sodium silicate activated slag and investigating its properties" on 2 August 2009. In this project, production of spongy concrete using new alkali activated slag cement was investigated. Spongy concrete is a product with many applications and recently, due to the considerations of using insulating and employing light materials in the construction, attracted significant attentions. The goal of this project was to substitute the traditional materials with new cement with alkali activated slag, to reduce the cost and improve the quality of the piece. The obtained results had been quite satisfactory.



3. Engineer Hassan Moradi defended his Master thesis entitled "Manufacturing cordierite glass-ceramic-carbon nanotubes (CNT) composite and investigating its mechanical and electrical properties" on 25 August 2009. In this research, the effect of addition of multi-walled carbon nanotubes to the cordierite glass-ceramic substrate was investigated. The cordierite substrate was prepared using glass-ceramic method. Following CNT manufacturing and surface treatment with acid, they were mixed with glass-ceramic and were sintered. Some pieces with different amounts of CNT phase were produced and their mechanical, electrical and sintering properties were investigated. Determination of their mechanical properties indicated that the composite with 5% CNT (by volume), showed 25% and 45% increase in the strength and fracture toughness respectively. Also, the investigation of electrical properties showed that addition of only 15% carbon nanotube (by volume), renders the compound some electrical conductivity.



4. Engineer Tahereh Talebi defended her Master thesis entitled " Factors affecting properties of yttria-stabilized zirconia (YSZ) coating on NIO-YSZ composite by electrophoresis precipitation, for the solid oxide fuel cell application" on 30 August 2009. In this research, we investigated the effective factors on the properties of thin layer of YSZ that coated NIO-YSZ composite by electrophoreses precipitation. Two groups of effective factors on YSZ precipitated layer electrolyte were investigated. In the first group, factors affecting bakability, microstructure and perforation of NIO-YSZ composite such as temperature and baking duration, starch percentage, on the porosity, the press pressure effect and the effect of method rendering substrate conductivity were elucidated. In the practical work substrate perforation and more importantly methods of rendering the substrate conductivity were amongst factors that affected YSZ layer properties and both cases were investigated in details. In the second group, the effect of electrophoresis related variables on the property of YSZ layer such as applied voltage, time of precipitation, suspension type and addition of de-ionized water were investigated. The effect of de-ionized water was very interesting and partly was investigated and could be investigated in



Energy use effi

In a meeting with the heads of universities, research centers scientific and technology parks Dr Seyyed Mohammad Tagh Bathaaee, head of Khajeh Nasi Toosi University of Technolog explained the efficiency o energy in big buildings make great impact on the economy.

Increasing cost of energy in th seventies (A D) highlighted th need for efficient energy system in the buildings. At first, centra energy control and managemer systems had found wid applications and as a result th wiring and software cost increased. With compute advancement, to reduce the costs the central control systems wer substituted with the distribute control systems. For this purpose surveillance and acquired contro systems (SCADA) was invente as a central monitoring system for buildings. This innovatio provided the operators with a access to the most importar equipment in different parts of th building to identify unusua conditions (unusual conditions o environmental parameters an technical notifications for the repa and maintenance) everywhere i and even outside the building. Thi service helped a lot to estimate th cost of the system functionalit and also the programming o repair and maintenance an improvement of control strategy Next step in reducing the cost was suggestion of intelligen building. That is, equipments wit capability of exchangin information with standar protocols, to perform functions o an intelligent building includin

Inorganic ma

The professional inorganic mate with the help of the expert staff PhD in inorganic chemistry, Ro master degree in analytical chemi BSc in chemistry and Nasim chemistry) and the modern semiconductor Department, perf inorganic materials with high pre by Atomic Absorption Spectrosco and the classical method includ titration procedures. In this la dissolutions, preparing solut standards and alkaline digestion the referred samples. This labora

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Materials and Energy Research Center

Newsletter

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Suggested Guidelines for the Improvement of the Laboratory and Research Services

The coordination between the applicants, for the laboratory and research services, and MERC complex of the current laboratories and workshops is the responsibility of the Analytical Admission Unit. This Unit, in addition to the provision of consultation and advice to the applicants, would receive the submitted laboratory tests and service orders and follow them up.

The Management of MERC is proud of its support, in the recent years, of the research activities for the development of science and technology of the nation, even for the research outside the MERC environment. Therefore, with the use of the profound capabilities of MERC, presenting the laboratory and research services to the investigators and researchers in the fields of applied science and engineering, with a view to facilitate research projects essential to our nation is amongst the objectives of MERC. In this direction and in order to improve the quality and quantity of the required services, it is essential for the technical managers and the laboratory supervisors to take notice of the following guidelines:

1. Evaluation of the required equipments and facilities for helping investigators to achieve their optimum performance in their projects related to science, technology and engineering.
2. Building trust with clients towards the test results, that may be achieved by considering the followings:

- Specific training of the managers and operators of the instruments
- Calibration of the instruments and provision of procedures for periodical calibrations
- Sufficient supervision and periodical inspections of the functionality of the instruments and operators performances by the laboratory technical managers.
- Preparation of manuals for the operational procedures of the instruments.
- Thorough knowledge of technical managers of the laboratories on the accuracy or inaccuracy of the test resu

3. Income sharing of the operators, professionals technical managers of the income earned from prov laboratory and research services
4. Establishing collaboration with industries and organiza for analytical services, followed by defining research pr required by the industries.
5. Inviting the laboratory authorities and professiona industries, research centers and organizations (suc automotive, petroleum and energy, defense, co aluminum, steel and mining industries) for familiarization the instruments and exchanging views.
6. Establishing collaboration with prominent universities research centers of the country with the viewpoint of de joint research projects.
7. Attracting academic staff, professionals, expert specialists in the field of instrumental analysis to be rendering high quality services.
8. Expanding the scope of the MERC laboratory service activities, regarding both human and instrumental resou in the metallic materials, polymer materials and compo fields.
9. Facilitating transfer of manufactured pieces and labo results to Tehran and other destinations especially consid the MERC location and its distance from the city
10. Advertising and informing other universities, rese centers, industries and related organizations of our sci services.

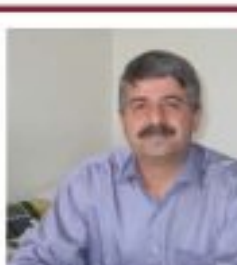
The growth of income form presenting these services t clients beyond MERC, in the past 15 months, bein indication of increasing trend of offering services to applicants, resulted from the sincere efforts of the working staff of the laboratories, Pilot, Analytical Admis information technology and Postgraduate units.

Presence of MERC on International Scenes

The 9th International Symposium on Measurement Technology and Intelligent Instruments (Saint Petersburg, Russia)

This ultra specialized symposium has been initiated by china in 1989 for the first time, and was held in different countries every other year thereafter. This green seminar with theoretical standpoint of measurement technology of the precision tools was held, this time, in Russia. In this symposium Engineer Koochakzadeh and Dr Keshavarz Alamdari presented an article entitled **"Thermal effects of platinum electrode on the PZT thin layer used in the**





performed for finding an appropriate hydrometallurgical method for dissolution of valuable metals; zinc, cobalt and manganese. Hydrogen peroxide was used as a reductant in a sulfate solution. The studied parameters for optimizing extraction (or recovery) conditions included the concentration of sulfuric acid solution, the amount of reductant and the liq solid ratio. The obtained optimized conditions were: 20 sulfuric acid solution, liquid to solid ratio of 10 and 3 volume hydrogen peroxide concentration at am temperature. Under these conditions more than 90