**Dr. Aboutorabi**: With a strong belief and will power, Iranian people won the revolution and the imposed 8-year war and so guaranteed the security, independence and freedom for their country and fellow compatriots.

**Dr. Basu (The Manager of Fuel Cell and Battery of Calcutta's Glass-Ceramics Research Center):** The collaboration of both Research Centers for the technical development of solid oxide fuel cells is a great objective; the results of which can be beneficial for the people of both countries in future.

# News

Number 14, J

## Latest News

### Commendation of «Winner of Energy Efficiency Contest», «Expectation Era» and «Top Pupils» during Mid-Shaban Celebration Ceremony

The anniversary of the Mid-Shaban was celebrated on Tuesday August 7th in the Shaheed-Bayat-Movahed Auditorium. In this ceremony, Dr. Davood Rastegar Moghadam was commended on account of his superior proposal on **Energy Optimization Contest**, the winners of the **Expectation Era** contest were praised for their high records and the top employees' children were given Parsiyan credit-cards for their acquiring of high scores during their last-year school grades.

Continued on page 2.

### The Annual Ordinary Meeting (Second Round) of the Consumer's Cooperative Society of the MERC

The annual ordinary general meeting of the MERC consumers cooperative society was held on Saturday August, 4th in the Shaheed Bayat Movahed Auditorium. At first, the difficulties related to the opening of the cooperative shopping center were explained to the audience and then a 20-day deadline was granted to the former board of managers to transfer the remaining funds of the corporation to the newly-elected board of the managers.

### Meeting of the MERC Housing Cooperative Society

Meeting with members of the managerial board of the housing cooperative society was held in presence of the inspector of the cooperative society on July 19th at MERC. The executive director descried the procedures taken to purchase land pieces from Sanjesh Organization for construction of 2-bedroom 72, 75 and 95 $m^2$ apartments in the southern Naz town. She told the audience that the permission and plans for construction of 25 blocks of five-storey buildings in the lands had been issued.

### Book Reading Contest

On the auspicious anniversary of the birthday of the savior of the mankind, Imam of the Era, the cultural affairs department held a contest named «Expectation Era» supervised by the prayer leader of the MERC. The winners were offered cash prizes in the Mid-Shaban ceremony.

### One-Week Vacation

By approaching the holy month of «the feast of God», based on the employee's request for taking journey during summer, in order to provide an opportunity for upgrading of the MERC's telecommunication system, the board of directors passed a resolution and officially declared a one-week holiday from 15-22 of August. Certain offices such as public relations and installation-repair departments kept working hard during this week.

### Interviewing PhD Candidates (from among top graduate students)

The regulations of the Ministry of Science, Research and

## The International Exhibition of U Cen

The Unex International Exhibition with th "bright horizons for the techno-collaborations of Iran and Tajikistan" was city of Dushanbe at Unity Palace, 6-9 July

**On July, 6th:** The Deputy of Tajikistan's Science made a speech in the ina ceremony where Dr. Khoramshad (th de Mi S Re Te of Ab Ra (T Mi Sc a ch un

from both countries were present. After officials paid a visit to the pavilions and exhibition. During a visit to the MERC sta briefly elaborated on its achievements a to its activities. Dr. Khoramshad said that is one of the most active Research Cente

**On July 7-8, 2009:** Because of the inces of Dr. Vaezi, Dr. Amini and Mr. Niko MERC stall at the Unex Exhibition had tur attractive place for the display of educational and research achievements the MERC. Since some of the inven instruments could not be transported Tajikistan, therefore, it was not possible display them to the visitors, nonetheless explanations about these instruments w given to the visitors. Most visitors w impressed by the products displayed at stall, and they demanded a closer tie MERC especially in the fields of r energies and application of nanopowder different industries. Professor Safar physics lecturer at Tajikistan Techn University, while expressing his willingn for closer collaboration with the experts



## Sarrafi: To realize the objectives

## Mid-Shaban Celebration

Continued from page 1:

**Dr. Sadrnezhaad**: After congratulating the Sabanieh days and important birthday anniversaries especially of the promised Mahdi to the audience and Muslims throughout the world, he talked about Islamic vision and the responsibility of scientific and research centers to expand knowledge and human values as related to the Shabanieh days. He then elaborated on how the winners of «Energy Optimization», «Expectation Era» and top pupils were selected and on the opening of the consumers cooperative store. He added: "God willing, this shopping center will be at the service of our colleagues". He also mentioned MERC progresses in launching of new laboratories and the purchase of advanced equipments and added: "with the assistance of Allah and the hard work of the staff, MERC has greatly increased the quality and quantity of its services and it has achieved remarkable achievements in the domain of cultural, scientific, research and educational affairs. Referring to the staff children present in the ceremony, he called them the "future builders" of the country and wished them prosperity and success. Then the public relation office played a short film about the MERC activities.

**Dr. Seyed Mohammad Abutorabi** the guest speaker of MERC, while expressing his pleasure for being at the MERC, said: "I use this opportunity and try to briefly touch upon the main objectives of revolution of the human savior as the promised Mahdi. One of the outcomes of Imam's uprising will be security. Security is a precious and dear commodity which everybody looks for, so that they can fulfill their potentials. Another divine earth. He then referring to Islamic Revolution of Iran continued: "we have experienced some of the promises in our revolution. The downtrodden nation of Iran revolted against discrimination, poverty and injustice. This revolution and its achievements is a precious gift for posterity. In the past, foreigners used to control everything in Iran. In fact, our nations had turned into slaves for the foreign powers. Today, we take pride on being independent and our defense against the imposed war brought us security, independence and freedom. We should be grateful to all those who shared with us in this wonderful achievement".

In last part of the ceremony, the officials presented MERC prizes to the winners .

### A. Top students

**Pre-university:** Mahdi Hajali, Reza Mirzaee.

**Third Year High School:** Maryam Shami Harris.

**Second Year High School:** Seyede Parastou Shahmiri, Mohammad Reza Pazouki

**First Year High School:** Amir Nasiri, Seyed Nima Mirkhani, Elham Adineh, Anita Pormohammad Taghi, Seyed Mohammad Masoud Sadrnezhaad.

**Third Year Guidance School:** Gelare Ghafariasl, Seyed Mohammad Saeed Alavi, Farnaz Noraee, Ali Tadayon, Samane Amiri, Maryam Yazdanirad, Elnaz Dehgan.

**Second Year Guidance School:** Parisa Parsa.

**First Year Guidance School:** Sayna Yasoubi, Fatemeh Nemati Tasande, Homan Kazem Zadeh, Amir Zannouri, Reza Zareyee, Seyed Sina Mirkhani

**Fifth Year Primary School:** Amir Hussein Shah Koupa, Ghazale Hasanpor, Peyman Mahmoudniya, Sahar Abbasi, Seyed Mahdi Ashur Jopish, Leyla Nourouzi, Sharife Amini, Nazanin Rezaee, Mohammad Reza Shahraki, Narges Zarghami, Somaye Amiri.

**Fourth Year Primary School:** Ali Maghsoudipor, Marziyeh Maleki, Behnam Rabiani, Pouya Lotfollahbeygi, Melika Rajabi Asghari, Kimiya Aghaee, Mohammad Reza Nikbin.

**Third Year Primary School:** Behnam Rastegar Moghadam Mobaraki, Seyed Sina Alavi, Simin Reysi Dehkordi, Zahra Nasiri, Arvin Abasporsani, Sara Tadayon, Saghar Tadayon, Mohammad Ali Shahraki, Zahra Hassan Tamouri, Mahfam Nouranyan, Parinaz Shahmiri.

**Second Year Primary School:** Porya Anteh, Reyhane Amini, Zahra Yazdi, Asal Karimi, Ali Jabari, Maral Chavoushi Tehrani, Mohammad Reza Rezaee, Niki Mirza Mohammadi Kosarriz.

**First Year Primary School:** Hannane Dinmohammadpour, Rana Alikhani Hesari, Ali Rezaee, Katayoun Shahkoupa.

### B. The Winners of the Expectation Era Contest

This contest which was supported by the "Prayer Tribute and Cultural Affairs Office" under the supervision of Haj Agha Hassan Timouri (the prayer leader at the mosque of MERC) had the following winners:

Misters Mohammad Anteh, Alireza Baneshi, Valiollah Tarverdi, Nabiollah Tarverdi and Mistresses Zari Behniafar, Maryam Zameni, Zhila Ziayerad, Zahra Talebzadeh, Masome Enayati, Maryam Fouladiyan, Seyede Maryam Ghaderi, Mona Ghotbizadeh, Marjan Kashanaki.

### The Winners of the Energy Consumption Optimization Proposal Contest

At the end of the ceremony, the director of the MERC expressed his gratitude to Dr. Rastegar Moghadam for his efforts in nutrition department, health and sanitation office and contest performances and offered him with a present for his selected proposals for energy consumption rationalization.

## Presentation of student's seminars and projects

**1. On June. 20th. Minoo Zamanifard presented her seminar entitled: "The application of One-Dimensional Nanostructures in Chemical Sensors".**

Nowadays the production of micro-sized and highly stable materials for chemical sensors used in high temperatures has turned into one of the technological challenges for researchers. For making the nanostructures stable, different methods such as adding an outside element or another phase are used. Another method currently used is the production of one-dimensional nanostructures for the oxide of a given material. In this seminar, the advantages of one-dimensional nanostructures for the application in gas sensors were described.

**2. On June. 21st. Shirin Jabali Moeen presented her seminar entitled: "Ferrites Synthesis, their Properties and Applications".** From the technology point of view, magnetic nanoparticles of spinel ferrites (Me Mg, Fe, Mn, Co, Ni, Zn, Cu, Cd, ...) MFe2O4 belong to an important part of engineering materials especially electroceramics which in recent years have become very significant due to their unusual physicochemical properties and their potential application in data storing systems, magneto caloric cooling devices, increase of contrast in magnetic resonance screens, magnetic fluids, absorbents of microwave radiations, diagnostic medical tools, drug delivery guideline, kernels of high frequency convertors, bar antenna, radio frequency coils, sensors and most recently as radar absorbents for the camouflage and coverage of military equipment. This seminar aimed to introduce the new ferrite synthesis methods for the production of products of special properties.

**3. On June, 22nd, Mohammad Mahdi Rafighdoust defended his master thesis entitled: "The production of molite – zirconium composites through gel casting and the study of their mechanical properties".** In this project,

molite-zirconium composites were produced through reactive sinter between alumina and zirconium by gel casting method. To do so, grout / slurry of alumina and zirconium was used. At first, the optimal stability conditions of the slurry was examined and then after casting, the final conditions such as their flexural strength, hardness, and toughness of the produced

reaction to certain gases decreases after a while. A new solution for this problem concerns the use of metal oxide composites like $TiO_2$ and $SnO_2$ which are known as a blend of catalyst and sensor properties. At this seminar, the features of semi-conductor couple materials were described.

**6. On July. 18th. Yadollah Ganjkhanlow defended his master theses entitled: "synthesis and study of nanostructures of luminance yttrium compounds doped with europium and erbium".** In this project, the Y2O3:Eu, Y2O3:Er and Y2O3:Eu,Sr compounds were synthesized by means of combustion, normal cell-gel, and micro-emulation synthetic methods. Then optical, structural and microscopic analyses were performed on the synthesized samples

and the compounds were optimized. The synthesized compounds had luminance property and they can be used in screens, monitors, fluoresce lamps and fluoresce paints.

**7. On July. 25th. Hussein Zareyee, defended his master thesis entitled: 'The Impact Of Effective Parameters In The Hydroxide Nickel Nanoparticles Deposition Process".** In this project by producing hydroxide nickel powder by means of chemical deposition method especially complex-decantation method, the impact of different processing factors on the decrease of particles size and the shape of hydroxide nickel particles and also

chemical composition were investigated. The results show that the complex-decantation method is a cost-effective and easy way for the production of nanosized and symmetrically homogenous hydroxide nickel powders. Moreover, by changing the parameter of complex analysis method, while preserving the uniformity, it is possible to produce spherical, chip and laminate particles. And then nickel oxide powder was produced by means of dehydroxidation reaction.

**8. On July 27th. Behzad Amini Kia gave a lecture on "The Comparison Of Mechanical Alloying And Self Diffusion Combustion Synthesis For The Synthesis Of Non-Oxide Ceramics".** Considering the widespread use of mechanical alloying and self-diffusion combustion synthesis methods in the

R

**1. Initiative pla double-glazed w** cover a vast area and temperature much, making windows would gr new plan propose MERC, instead windows with do decided to add distance to the pr of PVC bands.

**Methodology:**
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**Some education**

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**Students' pr outside the M**
Those proj (belonging to st from other res centers) which are in the MERC, sho sent to the Res Council to be disc and approved ther Research Office wi charge of adminis works.
**Trainee Applicatio**
The request of c students to wor trainees at the MER be accepted only of the faculty me assumes responsib
Attending se presentation an defense sessions

Materials and Energy Research Center

# Newsletter

Number 14, July & August 2009

## The installation of new equipment at MERC

**Atomic Absorption Spectometer:** It is used for the analysis of elements present in solutions. Elements such as zinc, iron, nickel, molybdenum, vanadium, etc.. can be measured with a precision of few milligram in liter (ppm) by this instrument.

The atomic absorption spectrometer works on the basis of the amounts of energy absorbed during changes in the structure or motion of the molecules by the atoms of the flame. At first, the sample is diluted to the degree necessary for a given element and then for atomization, it is injected into the flame. To produce radiation for a given element, special lamp for that element is used. In emission spectroscopy, atoms are excited to energy levels higher than their lowest normal levels (ground states) by means of electrical discharges (arcs, sparks) or flames. Identification of the elemental composition of an unknown substance is based on the fact that when the excited atoms return to lower energy states, they emit light of characteristic frequencies.

**Oven 707**: It is used for the drying of laboratory glassware and tested ores. It can hold a capacity of 707 liter and its temperature can be heated up to 250 $C^0$ . This oven has several layers where the needed items are placed on them and dried by passing hot air through them. This oven is automatic and can be programmed and connected to computer. It can also be linked outdoor by a chimney.

**Orbital Shaker**: Shaking horizontally and vertically, this instrument is used for the shaking of materials. This is used for chemical reactions which require long synthesizing times. For instance, this device is used for solvent extraction and leaching processes. It is also suitable for doing equilibrium reactions.

**Centrifuge:** Rotating with a high speed, this device can be used for the concentration and purification of

in leaching synthesis processes.

**Spectrophotometer (UV/VIS)**: it is used for measurement of concentration of elements pre in solutions such as copper, vanadium, etc....it works on the basis of the radiant energy transmitted or reflected by a body as a function of the wavelength. Ordinarily the intensity of the energy transmitted is

compared to that transmitted by some other sy that serves as a standard. According to Bouguer Lambert's) law, each layer of equal thickness c medium absorbs an equal fraction of the er traversing it. According to Beer's law, the absor capacity of a dissolved substance is di proportional to its concentration in a solution. Fo analysis of elements, at first the solutions are di and then a given reagent is added to it. The ado of the reagents produces color complexes in solution with an intensity which is proportional t concentration of element in the solution. instrument has an incandescent or fluorescent which radiate on the sample and by measuring intensity of the reflected radiation from the sar the concentration of the desired element ca determined.

**Rotary (vacuum distillation)**: This instrument three parts namely steam ejector, vacuum pump the package. It is mainly used for the separation of liquid phases by means of distillation. By changing the temperature and viscosity, the boiling points of liquids can be changed and this advantage is used to

separate fractions. This instrument has a co tower through which cold water passes throu spiral pipe and thus liquefies the vapors around i

**Ultraviolet spectrometer (FTIR)**: ultrav spectrometry is a useful and common method fo identification of materials. The frequenc