ACS San Francisco Session Summary

Jan Marwan

The New Energy Technology Symposium (NET)—a Division of Environmental Chemistry (ENVR) session at the 239th American Chemical Society (ACS) National Meeting and Exposition—was held on March 21-22, 2010 in San Francisco, California (the entire ACS meeting ran until March 25). The symposium, held at the Parc 55 Hotel, was organized by Jan Marwan and co-chaired by Fran Tanzella.

Based on the number of abstracts submitted, the San Francisco meeting was one of the largest ACS national meetings ever. Attendees participated in thematic programming on the topic of "Chemistry for a Sustainable World" and in technical sessions presenting cutting-edge research and discoveries in chemistry and related fields.

The NET Symposium to a large extent offered presentations on low energy nuclear reactions (LENR), historically known as "cold fusion." The program was extremely full and the schedule very tight. A total of 61 abstracts were submitted to this symposium, requiring four half-day sessions plus one poster session. There were a large number of participants, as well as many attendees who came just to hear the presentations.

The NET symposium, with nearly 50 scheduled oral presentations, lasted for two days and the audience was counted to be 80 at peak and 60 on average—a great turnout. Most presenters were from the United States, but presenters and attendees also came from around the world, including Italy, Japan, Germany, Russia, the Ukraine and India. A number of expected presenters listed in the program were not able to attend (Xing-Zhong Li, Jacques Dufour, Tadahiko Mizuno, Yasuhiro Iwamura, Xingliu Jiang and Dimiter Alexandrov), but they kindly advised the organizer in advance so that he could act quickly to fill the gap by giving other presenters more time to speak; their papers will be included in the Proceedings. This extra time in the schedule was convenient, since those LENR speakers in attendance had a lot to report on.

Mitchell Swartz also could not attend the conference, but his very interesting talk on "Impact of an Applied Magnetic Field on a High Electrical Impedance LANR Device" was given by Larry Forsley. The lecture that was to have been given by Andrei Lipson, who passed away suddenly on November 1, "Charged Particle Emissions from the Surface of the Pd and Ti Deuterides Upon Their Excitation with Electron and X-Ray Beams," was given by George Miley as a tribute to honor Andrei, a great Russian scientist.

As in other years, there were numerous attendees interested in the LENR field who have been following up on the research. This time, we also had many people in the audience from outside our community who, coming from other ACS sessions, dropped by and listened attentively and appreciatively to our presenters. This is what we have been hoping for and expect to happen in the future. This is proof that LENR research is gaining widespread interest and attention.

Although the schedule was very tight, about five minutes was provided for discussion at the end of each presentation. We all missed Scott Chubb, who has always actively shared ideas and brings positive energy to discussions. Nevertheless, the paper discussions at this meeting were very fruitful, and we want to thank all the contributors who, by their questioning, made this meeting interesting and exciting. This always shows that our LENR community, although very closely linked like a family, is able to critique each other to improve the quality of research.

During lunchtime on March 21, the ACS set up a press conference to air on ACS LIVE on its website, with the headline "A potential new energy source so controversial that people once regarded it as junk science is

The ACS press conference with LENR experts was held on March 21 and featured Dr. Melvin Miles, Dr. George Miley. Dr. Vladimir Vysotskii, Dr. Peter Hagelstein, Dr. Michael McKubre and Dr. Jan Marwan.

Photo courtesy of ACS/Michael Bernstein.

moving close to the mainstream. . .” The ACS invited Michael McKubre, Peter Hagelstein, Vladimir Vysotskii, George Miley, Melvin Miles, Tadahiko Mizuno and Xing-Zhong Li to represent the group and their work. As mentioned above, both Mizuno and Li were not able to attend the meeting. Li provided half a page of text briefly summarizing the main goals of his research, and Jan Marwan read this at the press conference.

A Sunday evening reception was held at the Parc 55 Hotel, where the symposium was being held. Participants got together and exchanged information on LENR research topics. The evening of Monday, March 22 participants came together at Annabelle’s, a fine restaurant centrally located in San Francisco. Again, we had a chance to chat, this time feeling more relaxed after the last session of our symposium.

The days following the symposium, a couple of participants took the chance to go to other sessions at the ACS. We also went to SRI International in Menlo Park, and even were taken through the wine country of Northern California. We all had fun, exchanged information about LENR during our symposium, and explored the beauty of the Bay Area. This New Energy Technology Symposium has been regarded as one of the most successful symposiums organized at the ACS, and we would like to invite you next year when the symposium will be held in Anaheim, and in two years in San Diego.

The following are short reviews of the papers presented, based on the abstracts submitted and the presentations. To give this overview we rely on those who carefully and thoughtfully listened to all the presentations and especially someone who provided a short review for his Japanese colleagues. Akito Takahashi summarized the oral presentations, which we greatly appreciate and from which we want to extract some useful information.

Sunday, March 21 Morning Session: Theory

During the first session, interesting and thought-provoking papers were presented by theorists, who have all developed their own model as contribution to solving the puzzling LENR effect mechanism. Many different models compete mutually, exchange information and help comprehensive understanding of LENR to advance. Although each theorist tries to approach the solution of this problem from a different perspective, there is, to some extent, a common physics background to start from to investigate the LENR phenomenon, namely to consistently explain major experimental claims such as excess heat with He ash, but without significant radiation, and transmutation reactions.

Yeong Kim presented two papers addressing the theory of Bose-Einstein condensation nuclear fusion to describe the experimental results of deuteron-induced nuclear reactions in metals observed in electrolysis and gas loading experiments. The theory, he claims, is capable of explaining most of these diverse experimental results. The theory is based on a single conventional physical concept of Bose-Einstein condensation of deuterons in metal and provides a consistent theoretical description of many of the diverse experimental results. It also has predictive powers, as expected for a quantitatively predictive physical theory.

K.P. Sinha presented a paper titled “Tunneling Beneath the ^{4}He* Fragmentation Energy” (co-author Andrew Meulenberg). They assume the so-called “Lochon model” plays a significant role in theoretically describing LENR effects. A Lochon is a pair of two 1s electrons for a proton (deuteron) having anti-parallel spin to each other. The authors model a large screening effect on Coulomb repulsive force between a deuteron pair. The assumed trapping potential for the d-d pair may become very deep, such as several MeV, and therefore they consider the two-body excited energy of ^{4}He* to be ΔMc^2 = 3-4 MeV. Every tightly bound electron state around the d-d pair must be seen in a finite scale domain of nuclear strong interaction. They assume a Lochon can become such a small entity.

Akito Takahashi presented his 4D tetrahedral symmetric condensate model as one theoretical model which can give rational explanations for the key LENR experimental results, such as heat emission with ^{4}He ash and without neutrons. The two body d+d fusion cannot give ^{4}He as a major product, he claims. If that happens the ^{4}He* (Ex) state with Ex < 19.8 MeV, the final product becomes ^{4}He with ground state, after electromagnetic transition. To realize this process by a d+d reaction, there should exist the third coupling field which must take more than the 4 MeV difference energy (23.8 MeV - 19.8 MeV; here 23.8 MeV is Q-value of a d+d fusion) of the d-d system in the initial state interaction. The many-body interaction process between the d+d pairing and the third field of photon-phonon coupling in the lattice of condensed matter may be considered. Due to the very short range force of d+d strong interaction and its very short lifetime of virtual intermediate compound state, no processes have ever been proved to remove the 4 MeV gap energy. Takahashi presented two papers: “Theoretical Aspects on Deuterons-to-^{4}He Channels” and “Final Products of 4D-Fusion by Tetrahedral Symmetric Condensate.”

Peter Hagelstein has been developing his model in detail for many years. Recently, he published a paper in *Naturwissenschaften* about the yield of secondary reaction neutrons in D-contained condensed matter by energetic alpha-particle injection. This analysis gives an estimate of highest kinetic energy of LENR induced ^{4}He by D-related fusion reactions. He is trying to find an answer to why significant radiation has not been observed in experiments, while excess heat and ^{4}He production exist. In the lossy spin-boson model that he described, a large energy quantum is converted into many small quanta. This is the basis from which he started developing his mechanism. His paper, “Modeling Excess Heat in the Fleischmann-Pons Experiment,” is co-authored by Irfan Chaudhary.

Tetsuo Sawada outlined in his introduction of “Underlying Mechanism of the Nuclear CF Implied by Energy-Momentum Conservation” why a usual d-d reaction does not have a ^{4}He channel. He prefers a magnetic monopole (MMP) induced d-d reaction. A MMP can make an “infinitely deep” trapping potential since MMP mass is infinity and the energy state of a trapped d-d pair can be -4 MeV lower than usual d-d molecule. Thus MMP can provide a very closely approached d-d pair with a deeply shrunken state. He thinks ^{4}He* excited energy may be removed by 4 MeV in this state and can go out to ^{4}He(gs:+) with 23.8 MeV kinetic energy.

George Miley’s LENR has embedded ultra high density deuterium “clusters” (D cluster) in palladium (Pd) thin films. These clusters approach metallic conditions, exhibiting super conducting properties. They represent “nuclear reac-

tive sites" needed for LENR. The resulting reactions are vigorous, giving the potential for a high power density cell. Clusters are achieved through electrochemically loading-unloading deuterium into a thin metal palladium film creating local defects which form a strong potential trap where deuterium condenses into "clusters" of ~100 atoms. Research now focuses on nano-manufactured structures to achieve a high volumetric density of these trap sites. "Ultra High Density Deuterium Clusters for Low Energy Nuclear Reactions" is co-authored by Xiaoling Yang and Heinz Hora.

Robert Bass gave a talk entitled "Only Conventionally Viable Cold Nuclear Fusion Theory?" He recalled an old theory review paper by Chechin-Kim-Rabinowitz (1994, *Int. J. Theoretical Physics*, 33, 617) and outlined "three miracles in cold fusion" (*c.f.* Huizenga). Bass claims that his resonant tunneling model (1991) can provide reasonable explanations for these miracles. He has written a number of papers on this subject.

Sunday, March 21 Afternoon Session: Excess Heat/Power and Calorimetry

During the afternoon of March 21, we had very interesting reports on anomalies by D(H)-gas loading in Pd-nano powders arranged with various metal-oxide flakes.

Tatsumi Hioki, initially scheduled for a poster, gave an oral presentation in which he outlined a series of results on D(H)-gas loading in Pd nano-powders incorporated in Al_2O_3 and ZrO_2 base. He observed D(H)/Pd loading ratios at saturated values of 2.7 for the first D-loading run (virgin sample runs) accompanied by significant heat evolution at a level over 2.0 eV/Pd-atom. However, repeated use of the same samples after evacuation and baking procedures provided very decreased D(H)/Pd loading values (0.7). The heat evolution was found to be significantly less (0.2eV/Pd-atom). He concluded that "big" heat levels in the first runs were due to the oxidation (formation of water) with continuous D(H) charging, and this would correspond to the fact that Pd/ZrO_2 and Pd/Al_2O_3 samples contained 100% PdO. The D/Pd ratios of 2.0 out of 2.7 were due to D_2O formation and liquidation in gas phase of the reaction cell chamber. This analysis is in striking contradiction to the forced oxidation experiment by the Kitamura group.

Winthrop Williams gave a detailed report on his electrolysis experiments in sodium hydroxide solutions using nickel wire as cathode and anode, evolving gases recombined to water within the cell. Cathode wire ends are connected to a high-current alternating pulse generator. A control cell, operated simultaneously, has an ohmic heater in place of electrolysis. Temperatures are compared to detect excess heat. The paper, "Light Water Electrolysis with Pulsed Current Between Two Cathode Connections: Search for Excess Heat," is co-authored by Robert Godes.

David Kidwell gave an interesting presentation on "Does Gas Loading Produce Anomalous Heat?," a paper co-authored by David Knies and Kenneth Grabowski. The group used Pd nano-powders of 2-5 nanometer diameter kept in zeolite base. Zeolite has a porous structure determined by many nano-holes at which Pd nano-particles are trapped. Charging repeatedly D-gas and H-gas alternately, they have found that these systems produce up to eight-fold more heat with deuterium compared to hydrogen. Furthermore, a characteristic signature of a pressurization reaction is its reversibility—the heat released upon pressurization should be absorbed upon evacuation. This anomalous heat effect by D-charging, he says, cannot be attributable to chemical reactions. He did not say "nuclear."

Melvin Miles gave two talks on co-deposition electrolysis methods ("Chemical and Electrochemical Studies of Co-Deposition Systems in H_2O and D_2O" and "Measurements of Excess Power Effects in Pd/D_2O Systems Using a New Isoperibolic Calorimeter"). He said that reproducibility of excess heat by the Pd-D co-deposition method is now 100%. In addition, he explained a new isoperibolic calorimeter which supports very precise and stable calorimetry measurements, by using a double tube of copper between which the thermal insulator is packed. Inside the inner tube he sets up the co-deposition electrolysis cell. This calorimetric design provides for high cell operating temperatures. The heat transfer coefficient (k_C) for the cell is 0.1334 W/K, the heat capacity (C_pM) is 456 J/K and the time constant is 40 minutes. Measurements of excess power effects using this new calorimeter were reported.

Francesco Celani gave two talks on D(H)-gas loading experiments using nano-coated thin Pd wires operating at high temperature of about 400-500°C. To apply the LENR heat release to power producing devices for industrial use, Celani said, "we will have to operate at a temperature as high as possible because of the efficiency to convert heat into electricity." In this regard, the approach by the Celani group is important; the Celani *et al.* papers are "Hybrid, High Temperature CMNS Reactor: Progress Report of Experiments Performed at INFN-LNF (Italy)" and "Improvement of Thermal Irradiation by Nanocoating of Thin Wires."

Francesca Sarto and E. Castagna gave very interesting presentations outlining material science aspects to improve the reproducibility of excess heat events. The evolution of the electromagnetic field at the Pd cathode/electrolyte interface during hydrogen (deuterium) loading is a complex mechanism that involves the modifications of the surface properties of the metallic electrode. In particular, the variation of the dielectric constant of the metal due to hydrogen (deuterium) permeation and charge polarization and the roughening of the surface morphology can affect the electromagnetic field spatial distribution in the region close to the metal/electrolyte interface. A tentative model to describe such effects was presented, with the aim to get a qualitative estimate of the relevance of these mechanisms to the excess heat production, and to give insight into the experimentally observed correlations between excess heat occurrence and cathode surface properties. Stefano Lecci and Vittorio Violante are additional authors on the papers "Material Characterization of Pd Foils Employed in Calorimetric Electrochemical Experiments" and "Role of Surface Properties in the Electromagnetic Field Interaction with the Pd/Electrolyte Interface."

Mitchell Swartz (presented by Larry Forsley) reported on the solution electrical conductance of a lattice assisted nuclear reaction device in a static magnetic field. Dual anode Phusor-type Pd/D_2O-$Pd(OH)_2$/Au (DAP) LANR devices were driven at their optimal operating point. Two current sources drove the loading and the four-terminal electrical conductance examination of the loading PdDx cathode. The applied magnetic field intensity was -0.1 Tesla. The magnetic field decreased the solution electrical conductance of the

operational DAP LANR system from 196.5 to 166.5 microsiemens (15.2% decrease). The decrease was greatest for lower electrical driving current (1 ma vs. 10 mA input current yielded $13.1^{+(-2.9)}$% vs. $7.87^{+(-7.4)}$% incremental conductance decrease). The decrease was greatest when the applied magnetic field was parallel to the driving electrical field intensity (parallel vs. perpendicular 15.2% vs. 0-9.8%). A larger impact resulted from increasing applied current (1 to 10 mA) which yielded a 76% increase in solution electrical conductance, irrespective of any applied H-field.

Akira Kitamura uses a revised twin system capable of carrying out Arata-Zhang-type gas loading experiments ("Anomalous Heat Evolution in Charging of Pd Nano-Powders with Hydrogen Isotopes"). He has found that hydrogen isotope gas charging of Pd nano-powders can produce anomalous large energy, and that the effect is a strong function of the particle size. The 10-nmÃ¸ nano-composite of PdÂ·ZrO_2 produced energy of 2.4Â±0.2 (1.8Â±0.4) eV/D(H)-atom, as well as large loading ratios of D(H)/Pd = 1.1 Â±0.0 (1.1 Â±0.3), respectively. These values are significantly larger than those investigated in earlier studies. Multilateral diagnostics for the sample are performed to clarify the underlying physics; *in situ* monitoring of neutron and gamma-ray, a Si surface-barrier detector (SSBD) or an ion-implanted Si detector (IISD) for charged particles.

Monday, March 22 Morning Session: Nuclear Transmutation and Tritium, Neutron and Helium Emission

Pamela Mosier Boss explained in her talk that the heat produced in her Pd/D co-deposition experiments is not attributable to the Joule effect, but shows that the cathode is the heat source. However, heat does not, by itself, prove that nuclear processes are occurring inside the deuterium-loaded palladium lattice, she explained. This requires the detection of some nuclear ash. The results of new CR-39 experiments were discussed as well as neutron and gamma ray emissions resulting from the application of the SuperWave and other charging protocols to the Pd/D co-deposition process. The paper, "Characterization of Nuclear Emissions Resulting from Pd/D Co-Deposition," is co-authored by Frank Gordon and Larry Forsley.

Prior to his scientific presentation ("Hot Spots, Chain Events and Micro-Nuclear Explosions"), Mahadeva Srinivasan gave a ten minute update about the ongoing preparation for the ICCF16 conference to be held February 2011 in Chennai, India. He then gave an executive summary of the Bhabha Atomic Research Center (BARC) cold fusion efforts in 1989-1990. Especially, he stressed the claims of obtaining anomalous neutron emission and tritium generation, sometimes as burst events. Deviation from the stochastic Poisson distribution of signals indicates, he argued, anomalous neutron emissions. BARC was the first institute where anomalous n/T yield ratios were observed.

Leonid Urutskoev, who has not been presenting in this field for a long time, summarized his paper on "Observation of Abnormal Quantity of Hydrogen Under Electrical Titan Explosion in Liquids." He claimed anomalous amounts of H_2 gas production that occurs during pulsed electric explosion on thin titanium foils in water. This effect is not consistent with a chemical reaction, he argued, because the oxygen released is in this process significantly less than calculated on the basis of a chemical reaction. To his mind, this result indicates that the source for this large amount of H_2 production is a nuclear effect.

John Fisher is now nearly 90 years old and still so active to present a paper. People have to respect his strong mission, presented in his paper "On the Production of Energy and Helium in Low Energy Nuclear Reactions." He believes in a line of "neutron-isotopes" along Z=0 and N=N line of the chart of nuclides. Proceeding from this assumption, neutron isotopes as "poly-neutron" state can make "freely-of-Coulomb-force" nuclear reactions meeting nuclei of condensed matter and with this, most experimental claims by LENR scientists could be consistently explained. He has extended his models of possible reaction channels for many cases for many years. He assumes that the reaction such as A+4n to An + ^{4}He is typical for 4D to ^{4}H + ^{4}He + 20MeV.

John Dash, who worked with John Bockris and Martin Fleischmann before the cold fusion saga, is continuing experiments at Portland State University. He presented a paper titled "Anomalous Elements on the Cathode Surface After Aqueous Electrolysis." He studied the cathode surface structure by using atomic force microscopy. He also used SIMS for the analysis of isotopic distribution of the cathode material before and after running electrolysis. He claims the existence of anomalies in isotopic abundance ratios.

Vladimir Vysotskii presented "Observation of Radiation and Transmutation Processes of Bubble Cavitation in Free Water Jet" (co-author Alla Kornilova). He claims to have observed anomalous X-rays (in 1.0-1.5keV) and optical light emission, probably induced by shock waves of water jet. Radiation was so penetrative to pass through a 1 cm thick iron plate-shield. Gamma-rays were not measurable. In his second talk ("Method of Low Energy Nuclear Reactions Acceleration by Formation of Correlated States of Interacting Particles"), he outlined ideas about a more universal mechanism that could help optimize low energy nuclear reactions on the basis of correlated states of interacting particles. To understand this mechanism, it may be necessary to provide significant increase in the barrier penetrability under critical conditions (low energy, high barrier), at which the rate of "ordinary" tunneling events is negligibly small, and can be applied to different experiments. Because he was invited to speak at the press conference about his results on nuclear transmutation in biological cells, he also briefly summarized this work at the end of his presentation.

Roger Stringham presented a DVD outlining his experimental sonofusion results ("Model for Sonofusion") that needed a mechanism to explain the measured ^{4}He, T, and heat produced. A model was introduced based on high density, low energy transient astrophysical behavior and it creates an environment for fusion events. The charged particles, deuterons and electrons, cavitationally implanted into a lattice where electrons are stripped from deuterons, charge separation, exist as accelerating electrons rushing back toward the deuteron cluster. The transient cluster is surrounded and stabilized by an accelerating shell of free electrons. Their electromagnetic forces squeeze and cool the deuteron contents into a BEC phase. The high Tc of the BEC deuteron cluster (no electrons are present) is due to the Mev differences between ground state and the next available energy state of the nuclear shell model. The fusion environment is essential to the cluster's low temperature and high

density. Fusion events of this model are similar to those in muon fusion.

Monday, March 22 Afternoon Session: New Perspectives

Andrew Clarens presented on "Identifying the Rate Limiting Steps in Sustainable Algae Production for Bioenergy" (co-author Lisa Colosi). Algae are considered to be a promising source of next-generation biofuels even though significant technological barriers must be overcome before they can be cultivated on large scales. Clarens noted that the results of a comparative life cycle assessment suggest that algae have a much larger environmental burden than either switchgrass or corn in several key impact areas, including greenhouse gas emissions and water use. These impacts are driven by the need to deliver large volumes of CO_2 and nutrients to the algae ponds. Algae's inherently small land footprint suggests that, with improvements, it could produce bioenergy more effectively than conventional alternatives. Toward realizing these improvements, experiments were conducted to evaluate the growth of two microalgae species in wastewater, particularly source-separated urine. Growing algae in these solutions was found to have important implications on algae harvesting processes using filtration.

Vittorio Violante, chairman of the ICCF15 conference in Rome, presented his jointly-authored paper "Material Science Behind the Fleischmann and Pons Effect." He analyzed the change of the chemical potential in the PdD_x lattice, using the Yenyo equation with traces of the stress tensor. He analyzed mass-transfer at the grain-grain boundary and the effect of crystal orientation. He found that the PSD (power spectral density) of the surface structure had sharp peaks for Pd materials which indicates excess heat, while non-excess heat materials had rather flat PSD spectra. On the basis of this one may predict and optimize excess heat production for specific materials even before the experiment started.

Fran Tanzella, co-chairman of the symposium, presented an interesting experiment titled "Cryogenic Calorimetry of 'Exploding' PdD_x Wires" (co-author Michael McKubre). Axial current through PdD_x wire induces high loading ratio as claimed by Mengoli, de Ninno, Celani, Tripodi and others. Tanzella's group is also trying a Case-type gas loading experiment using a SiO_2 plus nano-Pd. They observed a change of the $^3He/^4He$ ratio for sampled gas in a cell chamber analyzed by a dipole type mass spectrometer.

Peter Hagelstein presented results from a series of eight co-deposition experiments using the methods originated by Szpak, Boss and Smith in 1990-91 ("Observation of Excess Power and Isotope Effect Using D-Pd Co-Deposition Methods," co-author Dennis Letts). Their preliminary findings appear to support the general claim that excess power is produced when palladium and deuterium are co-deposited on a metal substrate. They found further that a gold-plated copper cathode works better than bare copper. They also observed that excess power only appeared when the gold-plated copper cathode was electrolyzed inside a platinum wire anode cage with a deuterium-based electrolyte.

Michael McKubre gave his talk, "Cold Fusion, LENR, CMNS, FPE: One Perspective on the State of the Science," on his discovered empirical formula of excess heat evolution with three conditions; namely, current density (electrolysis) over a threshold, loading ratio over threshold and a deuteron flux. He stressed negative and discouraging reports from MIT, Bell Lab, CalTech, and so on, leading scientific institutions that in 1989 missed to look at important experimental aspects to get cold fusion to work.

John Tossell presented "Catching CO_2: Natural Products, Big Molecules and Small Molecules as H-Bonding CO_2 Receptors." The abstract notes, "We recently studied an amidourea macrocyclic complex with CO_3^{-2}, which was formed by the direct removal of CO_2 from the atmosphere. This macrocycle contains an already assembled binding site coordinating all the O atoms of CO_3^{-2} through H-bonding to N-H groups. . .We need either a cheap natural product or a cheap small molecule which can be readily obtained and will bind CO_2 or its hydrolysis products moderately strong. We have now used quantum chemical computational techniques to evaluate structures, stabilities and spectral properties for a number of complexes of CO_2 and its hydrolysis products with H-bonding receptor molecules in solution. The receptor molecules studied include the natural product prodigiosin, large synthetic molecules containing multiple amine groups and cheap, small molecules such as urea and ammonia."

Vincent Calder (co-author Timothy Stark) presented on "Beneficial Uses of Aluminum Wastes Instead of Landfilling." Calder reported that recent field experiences show that landfills accepting both raw and incinerated municipal solid waste can undergo a highly exothermic amphoteric reaction of aluminum metal and alkaline water. This can result in the emission of noxious fumes and damage to the engineered components of the landfill. The authors investigated methods for the beneficial use of aluminum wastes instead of landfilling.

Thorsten Ludwig indicated that some of the most promising new energy technologies are those that use a vast vacuum state energy (vacuum fluctuations, zero point energy) as an energy resource. A fascinating effect in quantum field theory is the Casimir effect, which leads from microscopic fluctuations to a macroscopic force. This effect could be the basis for new energy technologies using ZPE. The effect is also closely related to the van der Waals forces. This work shows how to engineer the vacuum in order to build machines that run on zero point energy. A method based on quartz tuning forks was described regarding their usability for Casimir force measurements. Two papers were submitted: "Advances in New Energy Technologies with van der Waals and Casimir Forces Based on Vacuum Energy" and "Quantum Field Energy Sensor Based on the Casimir Effect."

Jan Marwan, organizer of the symposium, gave an interesting talk on fabricating Pd nano-structure designed materials and its electro-chemical performances ("Nanostructured Palladium Electrochemistry"). Akito Takahashi said, "We would expect, someday, an established recipe for producing and controlling nuclear excess heat using designed materials provided for customers. A dream or reality?"

The abstracts of the March 2010 NET papers can be found online, by clicking on each paper title at the following link:

http://abstracts.acs.org/chem/239nm/program/disciplineindex.php?act=presentations&val=New+Energy+Technologies&ses=New+Energy+Technologies&prog=93&multi=1931