

## SUSTAINABILITY & INNOVATION FOR A CLEANER ENVIRONMENT



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BUSINESS DEVELOPMENT AND MANAGEMENT (BMGT) WITH  
SUPPORT FROM BASF*



**TUESDAY, 30 AUGUST 2011**

**9:00 AM—11:50 AM, 2:00 PM—4:10 PM**

**COLORADO CONVENTION CENTER—ROOM 705**

- 9:05 AM LAYERED DOUBLE HYDROXIDES PREPARED IN COAL: MORPHOLOGIES AND THERMAL PROPERTIES - ANNING ZHOU, BO LIU
- 9:35 AM INNOVATION BEYOND INVENTION - JACK T PEREGRIN
- 10:05 AM HOW DOES OPEN INNOVATION DRIVE SUSTAINABILITY? - STEPHEN T. MELLER
- 10:35 AM INTERMISSION
- 10:50 AM SUSTAINABILITY INNOVATION CAPABILITY: THE CASE FOR INNOVATION BOARDS AND LIGHT TOUCH PROCESSES - STEPHEN K MARKHAM
- 11:20 AM SELECTIVE AND CATALYTIC CONVERSION OF BIOMASS - MAHDI ABU-OMAR
- 2:05 PM CHEMICAL CONSTITUENTS OF THE LEAF OF *ASPILIA AFRICANA* AS A SCIENTIFIC BACKING TO ITS TRADOMEDICAL POTENTIALS - THERESA A. ABII
- 2:35 PM ADDRESSING THE BUSINESS CASE FOR SUSTAINABILITY AT THE INDUSTRY/CONSUMER INTERFACE - AMANDA JOSEY
- 3:05 PM DISRUPTIVE TECHNOLOGY FOR BIOMASS PROCESSING USING IONIC LIQUIDS - DANIEL T DALY, ROBIN D. ROGERS, GABRIELA GURAU
- 3:35 PM ACCELERATING GREEN: CASE STUDIES ON OPEN INNOVATION FOR SUSTAINABLE CHEMISTRY - MATTHEW HEIM

**Tuesday August 30, 2011**

**Sustainability & Innovation for a Cleaner Environment**

**Colorado Convention Center - Room 705**

**9:00 AM – 11:50 AM**

**2:00 PM – 4:10 PM**

Organizer: Daniel Daly

**9:00 AM      Introductory Remarks**

**9:05 AM      Layered double hydroxides prepared in coal: Morphologies and thermal properties**

*Anning Zhou, Bo Liu, Wei Xu* Chemistry and Chemical Engineering, Xi'an University of Science and Technology

**Abstract:** Coal fires induced by spontaneous combustion have greatly threatened the health and safety of the miners and caused numerous environment problems and huge economic losses. ZnAl-Layered double hydroxides (ZnAl-LDHs) were synthesized in coal via a co precipitation method by using de-ashing Shenfu coal as template, which was aimed to be a innovate fire precaution in coal spontaneous combustion. Through calcination treatment of coal template, the structure and morphology of ZnAl-LDHs were investigated by regenerating the calcined products of ZnAl-LDHs / coal. The samples were characterized using XRD, SEM and DSC. The results indicated the growth of ZnAl-LDHs in coal was effected by the porosity of coal, thus different morphologies and sizes were obtained according to the coal pore structure. Coal with ZnAl-LDHs had a higher thermal stability than pure coal, which provided LDHs a good potential to be a fire retardant in coal spontaneous combustion.

**9:35 AM      Innovation Beyond Invention**

*Jack T Peregrin* PARAGON Development

**Abstract:** Innovation should not end after initial chemistry or process invention. Innovation should include business models, channel, partnerships, alliances, and many other issues if the invention is to truly have optimal value. The paper and presentation address the tools and methodologies that have been successfully applied in hundreds of cases.

**10:05 AM      How Does Open Innovation Drive Sustainability?**

*Stephen T. Meller*, Proctor & Gamble

**Abstract:** The Procter & Gamble Company (NYSE: PG) is the world's largest consumer products company with global sales of approx \$80 Billion USD across more than 300 branded products in more than 180 countries with more than 127,000 employees. P&G has one of the strongest portfolios of trusted, quality, leadership brands and has been recognized externally as a leader in Innovation and is consistently ranked in the top global innovative companies.

This presentation will share various approaches that P&G as a global consumer products company is using (open) innovation to drive economic, environmental and societal

sustainability benefits. The overall focus for the sustainability innovation programs at P&G are on a reduction in our dependency on petroleum via feedstock and energy sourcing flexibility, and an improvement in the environmental footprint of our products, packaging, and operations.

In September 2010, P&G announced its new sustainability long-term goals were, (1) all packaging would be made from renewable or recyclable materials, (2) all manufacturing plants would be powered with 100 percent renewable energy, (3) zero waste would be going from P&G or its consumers to landfills and (4) designing products to both please consumers and to maximize available resources. At that same time, P&G announced that by 2020, the company would: (1) replace 25 percent of all petroleum-based materials with “sustainably sourced” renewable materials, (2) power 30% of P&G energy used in manufacturing plants with renewable energy and (3) reduce overall waste to less than one-half of one percent.

**10:35 AM Intermission**

**10:50 AM Sustainability Innovation Capability: The Case for Innovation Boards and Light Touch Processes**

*Stephen K Markham* Poole College of Management, North Carolina State University

**Abstract:** Sustainability doesn't just affect the environment; it changes how your company does business. Environmentally sustainable ideas are not enough. Those ideas must find a place in the supply chain, production/delivery, distribution and sales models of your company. It's a lot to ask chemists to solve technical problems and at the same time present solutions to the myriad of business issues for new products, especially if those products change the company's business model, as can be the case for sustainability projects. This part of the Symposium discusses how companies structure their resources to stimulate and build the business case around new sustainable innovations. Companies use an “Innovation Board” structure and a “Light Touch” process to identify promising ideas, build business cases and generate support needed to help executives make informed decisions about sustainability projects. Tools and techniques for fostering sustainability innovation will be presented and discussed.

**11:20 AM Selective and Catalytic Conversion of Biomass**

*Mahdi Abu-Omar* Purdue University

**Abstract:** Approximately 1.4 billion tons of lignocellulosic biomass is an annually renewable source of energy and feedstock in the U.S. alone. The major components of biomass are cellulose, hemicellulose, and lignin- all polymeric and contain high percentage of oxygen. I will describe catalytic processes based on cheap and abundant materials that can be employed in tandem to unravel polymeric biomass into soluble components and their subsequent transformation into liquid fuels and/or high value organics.

**2:00 PM      Introductory Remarks**

**2:05 PM      Chemical Constituents of the Leaf of *Aspilia Africana* as a Scientific Backing to its Tradomedical Potentials**

*Theresa A. Abii* Department of Chemistry, Michael Okpara  
University of Agriculture Umudike

**Abstract:** The chemical constituents of the leaves of *aspilia Africana* were studied. The result shows the following chemical constituents; alkaloids ( $6.350 \pm 0.841\%$ ), tannins ( $0.188 \pm 0.035\%$ ), saponins ( $2.260 \pm 0.15\%$ ), flavonoids ( $2.006 \pm 0.11\%$ ) and phenols ( $0.109 \pm 0.15\%$ ) respectively. The concentration of vitamins per 100g wt of the leaf are as follows; ascorbic Acid ( $11.00 \pm 0.15\text{mg}$ ), niacin ( $3.045 \pm 0.081\text{mg}$ ), thiamine ( $1.940 \pm 0.025\text{mg}$ ), riboflavin ( $0.135 \pm 0.100\text{mg}$ ). The mineral elements determined are per 100g wt, Calcium ( $246 \pm 4.345\text{mg}$ ), Nitrogen ( $213.00 \pm 6.600$ ) and Phosphorus ( $25.00 \pm 0.500$ ). Zinc ( $34.675 \pm 0.54$ ), Nickel ( $10.975 \pm 1.330$ ), Selenium ( $10.875 \pm 1.880$ ), Boron ( $9.675 \pm 2.045$ ) and Lead ( $7.425 \pm 1.050$ ). These results show that the leaf may possess the medicinal potentials as claimed by tradomedical practitioners. **Keywords:** *Aspilia africana*, constituents, uses, tradomedical potentials.

**2:35 PM      Addressing the Business Case for Sustainability at the Industry/Consumer Interface**

*Amanda Josey* Human Nutrition North America, BASF

**Abstract:** Most global predictions indicate that there will be at least 9 billion people in the world by year 2050. This will create additional challenges for the food industry on producing consumer goods that are safe, affordable, socially responsible, and without additional burden on the environment and its resources. To address this challenge, consumer goods have to become more sustainable over time in areas such as safety, environmental impact, social aspects, and costs of ownership. Utilizing a set of traceability and sustainability measurements and self-improvement tools - combined with an independent product sustainability standard and certification program - can help food manufacturers and brand owners create and market more sustainable goods.

**3:05 PM      Disruptive Technology for Biomass Processing Using Ionic Liquids**

*Daniel T Daly, Robin D. Rogers, Gabriela Gurau*

**Abstract:** The inevitable depletion of petroleum-based resources and increasing worldwide interest in finding alternative renewable resources combined with the potential to produce multiple products from lignocellulosic biomass offers unique business opportunities if a disruptive technology which reduces the burden of high transportation cost can be developed. This development will then allow low-volume, but high-value chemicals to provide added value to the low-value, but high-volume liquid transportation fuels being developed. Current biological and chemical approaches being taken to utilize biomass are limited by the difficulty in processing (particularly pre-treating) lignocellulosic materials and the energy needed for separation of the components. Clean separation of the three major components of biomass (cellulose, lignin, and hemicellulose,) is the most important challenge for producing reproducible feedstocks for further processing. Ionic liquids (ILs), defined as salts which melt below 100 °C, have opened a door to effectively explore the carbohydrate economy by direct dissolution of

lignocellulosic biomass and partial separation of the major biopolymer constituents (by reconstitution of the dissolved wood using selected solvents), which facilitates enzymatic hydrolysis.

**3:35 PM      Accelerating Green: Case Studies on Open Innovation for Sustainable Chemistry**

*Matthew Heim* NineSigma

**Abstract:** With the ever-increasing expectations for more sustainable business practices, organizations are increasingly looking to the outside to find innovation partnerships that will help them keep up with the new demands. This new wave of sustainability-driven open innovation is driving an unprecedented number of new partnerships between businesses, universities and research labs. In this presentation, Dr. Matthew Heim will discuss the process of open innovation, and present various case studies of breakthrough innovations being achieved through collaboration in chemistry.

In this presentation, participants will learn the following:

1. How open innovation accelerates a company's innovation cycle
2. How chemistry is key in helping companies to achieve more sustainable solutions
3. Cases of several companies that achieved major breakthroughs in sustainability through chemistry and open innovation

**4:05 PM      Concluding Remarks**

**BMGT Program & Events**  
**242<sup>nd</sup> ACS National Meeting, Denver, CO**  
**August 28 - September 1, 2011**

**SESSIONS**

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**Sunday, August 28, 2011**

*Henry F. Whalen Jr. Award Keynote Address*

*In honor of Magid Abou-Gharbia*

3:45 PM-4:05 PM, Colorado Convention Center – Room 705

*Award Presentation and Reception*

*Monday, August 29, Grand Hyatt Denver Hotel, Pyramid Peak Ballroom*

5:00 PM – 8:00 PM

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**Monday, August 29, 2011**

*Beyond the Bench: Nontraditional Careers in Chemistry*

9:00 AM –12:00 PM Colorado Convention Center – Room 2C

*CHAL Joint with BMGT*

*Chemistry Plus [Business] = Opportunity*

1:30 PM-4:30 PM, Colorado Convention Center – Room 705

*BMGT Joint with CHAL, co-sponsored by CEPA*

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**Tuesday, August 30, 2011**

*Sustainability & Innovation for a Cleaner Environment*

9:00 AM-11:50 AM, Colorado Convention Center – Room 705

2:00 PM-4:10 PM, Colorado Convention Center – Room 705

*Support from BASF*

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**BUSINESS MEETINGS**

*Division Executive and Open Meeting*

Sunday, August 28<sup>th</sup>, 1:00 – 2:00 PM, Colorado Convention Center – Room 705

**SOCIAL EVENTS**

**Henry F. Whalen Jr. Award Presentation**

**BMGT and CHAL Reception**

**Monday, August 29<sup>th</sup>, 5:00 PM-8:00 PM, Grand Hyatt Hotel – Pyramid Peak Ballroom, Grand Hyatt Denver Hotel**

*BMGT, Joint with CHAL and Support from BASF*

**SCHB and BMGT Social Reception**

**Tuesday, August 30<sup>th</sup>, 5:00-7:00 PM, Cactus Club, 1621 Blake Street, Denver**

*SCHB, Joint with BMGT*

**ChemLuminary Awards**

**Tuesday, August 30<sup>th</sup>, 8:00 PM-Midnight, Sheraton Denver Downtown Hotel, Plaza Foyer and Ballroom A-E**

*BMGT Award Finalist*

**BMGT CO-SPONSORED SESSIONS**

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**Sunday, August 28, 2011**

***Empowering Tomorrow's Science Super Heroes***

***PRES Co-sponsored with BMGT, ANYL, CHED, CINF, COMSCI, FUEL, GEOC, HIST, I&EC, INOR, MEDI, PHYS, PROF, and YCC***

**9:00 AM-11:30 AM, Colorado Convention Center – Four Seasons Ballroom 4**

***Science on the Hollywood Screen***

***PRES Co-sponsored with BMGT, ANYL, CHED, CINF, COMSCI, FUEL, GEOC, HIST, I&EC, INOR, MEDI, PHYS, PROF, and YCC***

**1:00 PM-4:00 PM, Colorado Convention Center – Four Seasons Ballroom 4**

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**Tuesday, August 30, 2011**

***Small Businesses Spin-Offs into the Commercial Sector***

**8:15 AM-10:25 AM, Colorado Convention Center – Room 205**

***SCHB Co-sponsored with BMGT, and PROF***

***True Stories of Success from Chemical Entrepreneurs***

**10:30 AM-12:10 AM, Colorado Convention Center – Room 205**

***SCHB Co-sponsored with BMGT, PROF, and SCTF***

***Best Practices for Entrepreneurs: Panel Discussion***

**1:15 PM-3:05 PM, Colorado Convention Center – Room 205**

***SCHB Co-sponsored with BMGT, PROF, and SCTF***

**EVENT**

**Women Chemists Committee Luncheon**

**12:00PM-1:30 PM Hyatt Regency Convention Center, Centennial Ballroom F-H**

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**Wednesday, August 31, 2011**

***Water is the Next "Oil": How Small Businesses are Tapping in***

**9:00 AM-11:15 AM, Colorado Convention Center – Room 205**

***SCHB Cosponsored with BMGT***