

# Newsletter No. 40

## Web Edition

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The International Association for Stability, Handling and Use of Liquid Fuels, IASH, was founded in 1986. The purposes of the Association are to promote research and experimentation on the scientific and operational factors that affect the stability and handling of liquid fuels during their manufacture, blending, transportation, storage and use; and to provide a forum for the exchange of related ideas and information. Liquid fuels include crude oil and its refined products; products derived or processed from oil shale, tar sands, coal and natural gas; reformulated fuels such as those containing oxygenated components, and fuels derived from non-petroleum sources.

To accomplish its purposes and to promote a better understanding of the problems associated with the stability and handling of liquid fuels, IASH publishes a biannual newsletter, sponsors international conferences and publishes their proceedings. The Newsletter provides members with a medium for publishing notes on research in progress, discussing a problem that has been encountered with the stability and/or handling of a fuel, or commenting on some related technical issue of a general interest. IASH is an international, non-governmental, interdisciplinary, volunteer association. Membership is open to all individuals and organizations subscribing to its purposes.

Further information pertaining to IASH, including membership and availability of past conference proceedings, is available from the secretariat:

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### **A Note from the IASH Chairman**

*By Graham C. Hill, ECHA Microbiology Ltd.*

I am not sure if we have ever had to arrange an IASH Conference in more challenging and uncertain times. But in spite of travel restrictions due to swine flu, the poor global economy and wide fluctuations in the Dollar versus Euro exchange rate, I am cautiously optimistic that we can yet again look forward to an excellent IASH Conference in Prague, from 18 to 22nd October. The first encouraging signs were the strong response to the call for papers. Bob Morris has put

together a comprehensive program reflecting a broad range of fuel technical issues with presentations by 52 speakers. Please take some time to review the program at [www.iash.net](http://www.iash.net). As always, the latest developments in aviation fuels, marine fuels, automotive fuels, fuel cleanliness and analytical methods are all covered but the focus on alternative fuels and biofuels remains high on the agenda. I suspect issues relating to automotive biodiesel distribution, a topic close to my heart, will be of particular interest to attendees, as we continue to face some interesting challenges in Europe in respect of the seasonal stability of these fuels and their susceptibility to microbial attack.

Another encouraging sign for this year's conference is the continued high level of sponsorship. I wish to offer my thanks to the following companies for their support at a time when I know budgets are severely stretched:

**Gold Sponsor:** Fuel Quality Services, Inc.

**Silver Sponsors:** Air BP, ExxonMobil Aviation, Parker Hannifin, Pratt & Whitney, Saybolt, Shell Aviation, University of Dayton Research Institute, US Defense Energy Support Center.

**Exhibitors:** ECHA Microbiology Ltd., Facet International, GE Aviation, INTERTEK, KAM CONTROLS, INC., Lanxess Deutschland, PAMAS GmbH / Masley Gloves, Schülke & Mayr GmbH, Stanhope-Seta, US Naval Research Laboratory

I am still optimistic that, with a little more effort, we may yet get a few more sponsorships. Despite the high level of interest, I feel I must give a word of caution that we really do need your support to ensure the viability of IASH in these uncertain times. If we could get just one more Gold Sponsor it would go a long way to easing what we anticipate could be a significant financial loss this year. Shirley is eagerly awaiting your call!

I also want to encourage our members to register for the 11th IASH Conference as soon as possible. Our conference in Tucson in 2007 was attended by 190 delegates, one of the highest ever but it would be unwise for us to anticipate and budget on a similar attendance this year, given the current economic climate. IASH has historically alternated between hosting its conferences in North America and Europe and the European conferences are generally more expensive to run. There is no doubt it would have been more economically viable to break with tradition this year and host a successive conference in USA. But that would not tally with my vision that this remains a truly international association. We have tried to do everything we can to minimize the costs but I do not favour reducing the quality of the events and venues. Your feedback suggests you appreciate and expect a high standard at IASH Conferences and it is that high standard which sets us apart from other conferences. I think we have made the right decisions and exercised caution in the budget. We do have the funds to cover a loss this year but that is obviously not sustainable in the long term. We are hopeful that the economic climate will change for the better by the 12th International Conference in 2011. By planning early, we have already secured an excellent deal in contracting our venue for that year. Please mark the dates: October 16-20, 2011. In Prague, all will be revealed about the lovely location.

As I reflect that the 2009 Conference will be the culmination of my 2-year tenure as IASH Chairman, it is difficult to see where the time has gone. In addition to IASH, the last two years

have seen me face the challenges and rewards of an expanding family and an expanding business. There are some initiatives I would have liked to have devoted more time to but, as many on the board know, it is always a struggle to balance the commitments of IASH with our day jobs. Unfortunately, we cannot rely to the same extent as we have in the past on the goodwill and free time of board members in running our association, and the increasing costs of administration are another challenge we must face. I must applaud the good work by my predecessors, Vic Hughes and Steve Westbrook, in implementing the IASH Supporting and Sustaining membership scheme which helps meet this challenge. And it goes without saying that I must also thank those Sustaining and Supporting Members whose support is vital.

So I want to sign off on a note of optimism that the IASH Conference in Prague will be as successful as ever. I can guarantee it will be an international event leading the way in its quality and technical content. But it is your IASH and your conference so please sign up and encourage your colleagues to attend! I look forward to meeting you all in Prague.

### **Vice Chair's Article**

*By Robert E. Morris, Navy Research Laboratory*

This is the last issue of the IASH newsletter before the upcoming 11th conference. Being part of the organization of the conference has been an interesting and educational experience for me. I am happy to say that despite all the economic, technical (and viral) issues that we all have been facing this year, our program remains one of the strongest we have had. As the outset we were concerned that we might have some trouble filling the agenda, but the reality is quite the opposite. The last two years have seen some major changes in the landscape of energy technology. Some of the changes have been politically driven, while many are a result of the increasing and shifting user base for liquid fuels. We have thus seen a renewed emphasis on research and development as the technology struggles to keep pace with these changes. The program for the 11<sup>th</sup> conference reflects this with a strong emphasis on synthetic fuels and fuels produced from non-petroleum renewable resources.

As a researcher, it was my original intent to exploit my position as 1<sup>st</sup> Vice Chair to reinstitute the session on fundamental chemistry and expand the session on analytical methodology. However, those nefarious plans were short-lived, due to the need to accommodate important papers in the areas of synthetic, alternative and biofuels. Thus, many papers (including mine) could only be accepted as posters and I would like to thank those presenters who have graciously agreed to recast their oral presentations as poster presentations. This also means that we have an exceptionally strong poster session as well, and I encourage all delegates to take advantage of this session on Monday evening.

Our conference keynote speaker is William Harrison III, who is currently serving as Technical Advisor for Fuels and Energy at Wright-Patterson Air Force Base, in Dayton Ohio USA. He has also served as Technical Advisor in the Office of the Deputy under Secretary of Defense for Advanced Systems and Concepts for the U.S. Assured Fuels Initiative. Bill will set the stage for our conference with his keynote address, "Alternate Fuels: Strategy and Results", and give us the worldview of the challenges we face now and will have to address in the future to meet worldwide demands for production and utilization of liquid fuels.

We are also fortunate to have Vladimir Matejovsky as our keynote speaker for the session on Challenges in Fuel Distribution & Storage. Mr. Matejovsky has extensive experience with all aspects of fuels for combustion engines, including their handling and distribution in the Czech Republic. He has served as head of the research center of fuels and lubricants, as a lecturer at the Czech Technical University and has authored a reference book on automotive fuels. We are looking forward to Mr. Matejovsky's keynote address, "Production, distribution, Quality and Quality Assessment Systems" on Tuesday morning.

I will end by echoing Graham Hill's recommendation to register for the conference as early as possible. October will be upon us before we realize and we must all spread the word about IASH and the increasingly critical role our Association will play in the production, handling and use of liquid fuels, as we enter a new era of energy utilization. See you all in Prague!

### **Leo L. Stavinoha to Receive ASTM Award**

Congratulations to Leo Stavinoha on receiving the *George V. Dryoff Award of Honor* from ASTM Committee D02. Leo has been a member of Committee D02 since 1976 and has actively participated in a number of subcommittees and became Chairman of several subcommittees. He was singularly instrumental in bringing diesel fuel cleanliness and deterioration into the D02 spotlight through his leadership of Section 5 of Subcommittee E on Burner, Diesel, Non-Aviation Gas Turbine and Marine Fuels. Throughout his many years in D02, Leo has consistently worked to improve, revise and develop numerous standards related to fuel stability and cleanliness.

Leo served as the second IASH Chairman and received the *Nahum Por Award* in 2003. Congratulations to Leo on receiving this award!

### **FQS Celebrates 25 Years with an Open House**



Fuel Quality Services, Inc. (FQS) celebrated its 25<sup>th</sup> year in business and the opening of their new offices with an open house in January. The new FQS Training Center is located in Flowery Branch, Georgia (near Atlanta). The Training Center allows onsite training of customers on subjects relating to microbial contamination, detection, prevention and fuel compatibility, as well as many other topics of interest in the fuels market today. They also offer training at customer facilities and technical presentations for various groups. FQS personnel teach an SAE-sponsored training course as well.

FQS personnel provide over 150 years of combined technical and field expertise. They have continually enhanced their product lines to adapt to customer's needs and the changing markets,

such as Ultra Low Sulfur Diesel (ULSD) and Biodiesel. FQS has recently introduced a new line of test equipment for rapidly detecting microorganisms (bugs) in fuel storage systems within 10 minutes, not days or weeks. This equipment is recognized in ASTM Test Method D7463 for ATP detection. ASTM D7463 was pioneered and sponsored by Fuel Quality Services, Inc. and Merck KGaA Darmstadt, Germany. The equipment is a mainstay for many commercial airlines. Congratulations to Howard and Debra Chesneau and their staff!

## **Technical News**

### **Lanxess Receives "No Harm" Certificate For Its Biodiesel Additive Baynox Plus Agqm Tests Compatibility Of Stabilizing Agent**

*By Axel Ingendoh,*

*Lanxess Deutschland GmbH*

Leverkusen – Baynox plus, a biodiesel stabilizer from specialty chemicals company LANXESS AG, can be used without restriction to improve the stability of pure biodiesel and for addition to mineral diesel fuel, as currently required by law. This is the result of a large-scale test conducted by "Arbeitsgemeinschaft Qualitätsmanagement Biodiesel e.V." (AGQM). The organization's members, who cover nearly 80 percent of the demand for biodiesel in Germany, maintain a uniform, controlled quality management system for ensuring the high and consistent quality of the fuel.

In close cooperation with all mineral oil companies in Germany, AGQM tested antioxidants for biodiesel to identify any adverse side effects they display when mixed with brand-name diesel fuels and to determine their behavior in combustion engines. Baynox plus, an antioxidant from LANXESS, passed the numerous tests without restrictions and proved to be one of the most effective products. The reference standard for all of the "no harm" tests was BHT (butylated hydroxytoluene), the active ingredient in Baynox, the first biodiesel stabilizer to be approved by German mineral oil suppliers.

The addition of a stabilizer is particularly important for biodiesel made of vegetable oils with a high content of polyunsaturated fatty acids, the market share of which will rise sharply in the future. "Oils extracted from non-edible plants are increasingly being used to manufacture biodiesel," says Dr. Axel Ingendoh, antioxidant product developer in LANXESS's Basic Chemicals business unit, adding: "But the biodiesel from these non-edible oils, such as jatropha oil from India and Africa, and karanja oil from China, is very susceptible to oxidation and quickly turns rancid when exposed to air. An effective antioxidant like Baynox plus can reliably prevent that from happening."

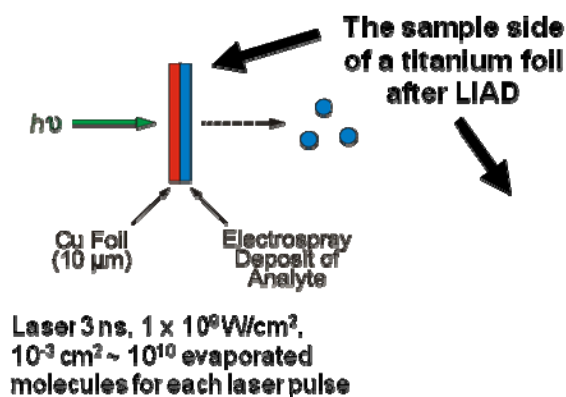
### **Novel Hyphenated Technique Permits Characterization Of Polar And Nonpolar Petroleum Molecules Simultaneously**

*By Hilikka Kenttamaa,*

*Purdue University, Department of Chemistry*

The laser-induced acoustic desorption (LIAD) technique has been demonstrated to allow the mass spectrometric analysis of complex mixtures that could not be previously characterized by this method due to their lack of volatility and resistance to ionization. LIAD allows the

evaporation of nonvolatile; thermally labile neutral molecules into Fourier transform ion cyclotron resonance mass spectrometers (FT-ICR). In this technique, the analyte is deposited as a thin layer (20 to 200 nmol/cm<sup>2</sup>) onto a thin (12.7 μm) metal (Ti) foil. The foil is mounted onto a specially designed probe and inserted into an FT-ICR mass spectrometer. Irradiation of the backside of the foil with a series of short (3 ns), high-energy (532 nm) laser pulses generates an acoustic wave that propagates through the foil and causes the evaporation of the neutral analyte molecules from the opposite side of the foil. The acoustically desorbed neutral molecules have unprecedented low internal and kinetic energies.



## Research Notes

### **Structure Of Aluminized Propellant Plumes Obtained Using Multi-Angular Infrared Emission Spectroscopy**

*By Yudaya Sivathanu*

*En'Urga Inc, 1291-A Cumberland Avenue, West Lafayette, IN 47906*

*Reprinted with permission from 55<sup>th</sup> JANNAF Propulsion Meeting (JPM), Paper No. 941*

Understanding the structure of solid propellant plumes is important for the design and safe operation of solid rocket motors. This paper demonstrates the use of multi-angular emission spectroscopy for estimating spatially resolved gas and particulate temperatures in plumes obtained by burning large propellant chunks. The multi-angular spectral radiation intensities from the plume were measured using two high-speed imaging spectrometers. The imaging spectrometers measured the spectral radiation intensities from 1 to 5 microns at a frequency of 1320 Hz. The imaging spectrometers had linear scanners integrated in their optics which enables measurement at 128 different view angles from each spectrometer. Therefore, the radiation emitted by the plume was measured at 256 view angles at a frequency of 11 Hz. The path integrated measurements were deconvoluted using a maximum likelihood estimation method in conjunction with a linearized equation of radiative transfer. The gas and particulate properties required for the method were obtained from the literature. Several different sizes of propellant chunks, ranging from six to twenty inches in diameter, were used in the experiments. The results obtained at two axial locations during the burn tests are reported. The results show that in most cases, it is possible to estimate the gas and particulate temperatures as well as their concentrations using emission spectroscopy. In addition, emission spectroscopy can be used to estimate the surface temperatures of solid objects that are immersed in the plume.

## Conferences

### **IASH 2009, the 11<sup>th</sup> International Conference on Stability, Handling and Use of Liquid Fuels**

**Intercontinental Hotel, Prague, Czech Republic  
18-22 October 2009**

**IASH** is the world's foremost international professional association devoted to all aspects of the stability and handling of liquid fuels, their refining, marketing, transportation, storage, laboratory analysis, and use. At the biennial conferences, IASH brings together leading authorities representing industry, government, academia and other sectors associated with the petroleum industry. At the IASH 2009 International Conference, a wide range of technologies relating to the stability and distribution of liquid fuels from the point of manufacture to end-use will be discussed in the following technical sessions:

#### ***Theme: Challenges for the Use of New Fuels for the 21<sup>st</sup> Century***



- **Synthetic & Alternative Fuels**
- **Fuel Filtration & Cleanliness**
- **Challenges in Fuel Distribution & Storage**
- **Biofuels**
- **Middle Distillate Fuels and Heavy Oils**
- **Additives & Additive Related Properties**
- **Analytical Methodology**
- **Microbiological Contamination**
- **Aviation Fuel**

**IASH 2009** will begin with an opening reception on Sunday and continue with four days of technical sessions. A separate poster session will provide an opportunity for technical presentations on new and innovative approaches to the definition and solution of fuel stability and handling problems. A commercial exposition will run throughout the conference.

**IASH 2009** will benefit anyone with a technical and scientific interest in the development, use, handling and storage of fuels, including fuel quality managers from refiners, distributors and fuel strategic reserves, fuel testing laboratories, research facilities, engine manufacturers, fuel additive suppliers and major fuel users.

#### **IASH 2009 Registration Fees:**

\$990 Speaker/Poster Presenter  
\$1,200 Early Registration by July 31  
\$1,450 Late Registration as of August 1

#### **SPONSORSHIP & EXHIBIT SPACE AVAILABLE.**

Contact Shirley Bradicich at [sbradicich@iash.net](mailto:sbradicich@iash.net).

**REGISTRATION & PRELIMINARY PROGRAM AVAILABLE AT: [WWW.IASH.NET](http://WWW.IASH.NET)**