Nov/Dec 2004 • No. 172

ESA Newsletter
Electrostatics Society of America - The Friendly Society

President's Message

Early in November a number of ESA members, including a number of Europeans and myself, had the pleasure of attending the 6th IEJ-ESA Joint Conference at the University of Tokyo. Dr. Tetsuji Oda, current IEJ president, did a splendid job organizing the conference. The meeting room, accommodations, social events, and even the weather, couldn't have been better. The final day of the conference was devoted to Atmospheric Pressure Plasma Applications, which included many papers addressing the issues of air purification and other environmentally-oriented applications. We truly appreciate the effort Dr. Oda and his staff put forth in creating such a wonderful, memorable event.

In this newsletter, there is a letter from John Chubb in which he comments on his experience with the preparation of standards and offers suggestions to help rectify this situation. I feel this is a topic that could become very engaging to a number of our members. I know a number of us have been involved with standards committees and, if not standards committees, we've all been involved with other committees where a consensus is needed. You would think scientists and engineers would make a wonderful group to work with, being highly educated, rational and open-minded. Sometimes this is true, sometimes it isn't. You bring a group of people together to address a problem and most everyone is coming from a different set of experiences and needs. The most positive committees are the ones where there is a broad base of shared experiences and perceptions. In today's environment, this would correlate with the applications employing the majority of folks and an area where the most money is being spent. I did a little research and found ASTM was started over 100 years ago to deal with breaking railroad rails, and ANSI was founded early in the 20th century to establish standards regarding pipe threads. Both of these were large markets indeed.

In most applications involving electrostatics the above situation isn't true. We have people who are drawn from a wide array of disciplines: math, physics, engineering, chemistry, etc. Some are self-taught, some come from the supply side, and some come from the user side of the equation. This presents a broad range of experience, language, knowledge and perceived needs that are to be overcome. The markets are generally so small that much of the time, the standards aren't that strong in the first place. Many times I've seen knowledgeable users making their own decisions on the suitability of the tests they wish to use. But then again, in some of these small markets, the users aren't educated enough to discern what is suitable for their application. This is when poor standards become entrenched. If the industry isn't large enough, affluent enough, or educated enough, a tradition based on faulty knowledge is established and perpetuated.

I support John's opinion of referencing technical papers in standards. I've talked with a number of people who refer to standards and have a limited understanding of what they are doing. I would think that educating the user could help considerably. Having a list of references included in the document and some means to update the list on a regular basis might be beneficial. Providing an educational appendix containing the intended purpose of the standard (area of application and intended users), the philosophy behind the standard, shortcomings of the standard, and possible alternatives, might also be considered. Systems should be in place to update or modify existing standards as needed. ASTM does have a system in place to modify existing documents.

If anyone wants to add his or her views on this topic please write to Mark Zaretsky or myself (addresses on back cover).

Wishing everyone a happy holiday season and a prosperous, productive new year.

Bill Vosteen
ESA President

CALL FOR PAPERS

2005 Electrostatics Society of America Annual Meeting
June 21-24, 2005
University of Alberta, Edmonton, Alberta, Canada

The 2005 Electrostatics Society of America (ESA) Annual Conference will be held on the campus of the University of Alberta in Edmonton, Canada from June 21 - 24, 2005. Join us for our technical sessions including comprehensive technical papers, a Student Paper Competition, informal discussions, poster sessions, and electrostatics demonstrations.

TOPICS OF INTEREST INCLUDE:

- Atmospheric Electricity
- Biological Applications
- BioMEMS and BioFluidics
- Breakdown and Discharges
- Charge Neutralization
- Computational Methods
- Display Devices
- Electrets
- Electrohydrodynamics
- Electrophotography
- Electrostatic effects in drug delivery
- Electrostatic Painting
- Electrostatic Powder Coating
- Electrostatic microencapsulation
- Electrophoresis
- Electroviscous effects
- Electrostatic Printing
- Electrostatic Propulsion
- Electrostatics Demonstrations
- Electrostatics Education
- ESD Prevention/Detection
- MEMS Devices
- Nonthermal Plasmas
- Nanoelectrospray applications
- Particle Control & Transport
- Precipitators and Cleaners
- Safety and Hazards
- Sprays and Droplets
- Triboelectrification

DEADLINES:

February 25, 2005	**Titles, Paper Summary and name of 1 - 2 relevant subject area from the list above are due to** *http://www.electrostatics.org*
Mid - February	**Registration and detailed conference information will be available at** *http://www.electrostatics.org*
March 5, 2005	**Notification of Paper Acceptance**
April 15, 2005	**Final Manuscripts Due. Instructions for authors are available at** *http://www.electrostatics.org*, **along with templates for MS Word and Latex.**

Authors may request that their manuscript be considered for publication in the Journal of Electrostatics.

STUDENT PAPER COMPETITION:

To encourage participation by student researchers, all presentations (either in the main session or poster session) that have a student as the presenter and first author will be considered for the student paper competition. Undergraduate and graduate students are eligible. Papers will be judged on their technical merit and the cogency of their presentation. Please indicate at submission that the abstract is to be considered for the student paper competition, and list all student authors.

Contact the General Chair for information regarding transportation and accommodations, or the Technical Chair for information regarding the technical sessions:

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Comments on the Preparation of Standards

John Chubb

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Over the years I have had involvement with the drafting of Standards documents on electrostatic measurements. I have found this quite a frustrating and, mostly, an apparently fruitless activity. There are several points about the preparation of Standards that I feel need to be brought into public discussion, and I offer the following comments for starters:

1) The objectives for Standards are set and documents prepared solely by people on national committees. The first most people know about a standard is when it is published.

2) Discussions do not involve anyone outside the committee – no expert witnesses are called

3) Although comments are made to encourage people to 'get involved', to be other than an observer one has to 'represent' some organisation

4) Standards documents are not 'peer reviewed' by anyone outside the committee system

5) If one has results of studies one feels likely to be relevant to standards discussions, no notice can/will be taken of these internationally unless these are made via one's national committee. (Where I have been involved with particular documents my attempts to encourage discussion and progress by sending documents to people involved has yielded no response – a blank!)

6) Standards continue in existence well after they have been shown to be inappropriate (e.g. FTS 101C Method 4046). There are numerous methods for measuring 'resistivity', surely they are not all really relevant? Keeping old Standards alive seems to serve the main aim of enabling people to say their products comply to Standard… This sounds good, but may not best reflect present appreciation of requirements, adds confusion, and probably only serves the interests of suppliers whose products 'conform'!

7) Standards usually only include references to other Standards. Why should not relevant peer reviewed technical papers be referenced?

8) There is no route of appeal. However strong a technical objection may be there is no route for anyone outside the committee system to lodge an appeal or register an objection

9) There is no funding to promote the investigation and testing of Standards. It is all done on a voluntary basis. This means that work is done by people with a vested interest (and relevant equipment/instrumentation) so results are then viewed with scepticism because 'they would say that wouldn't they'!

10) 'Round robin' testing of measurement methods only checks that different people in different laboratories (using either the same instrumentation or differing in detail) get comparable results with selected materials. They do NOT check the appropriateness of the method to match end user requirements nor the scientific soundness of the method. They do not stand instead of peer review, but alongside.

I suggest that:

- The objectives of work towards any new standard should be published before the start of discussions and document drafting. Publication should be on the standards organisation website as well as in relevant professional journals and to relevant professional organisations. Comments and suggestions should be invited and these should form part of the drafting brief.

- When a draft document has been prepared this should be published for comment in the same way as the 'objectives'

- It should be possible for 'expert witnesses' to be called to present ideas and comments to the committee

- All 'measurement method' standards need to include or refer to procedures for formal calibration

- Measurement standards should note or refer to how it was validated. This will be helped by a clear statement of the philosophy of the method in the introductory sections

- When the Standard document has been finalised this should be made available for at least professional peer review within a strict time limit – say 6 months.

- There needs to be Government funding support for the development and testing of Standards

By opening up the process there will be greater interest and involvement in the development of Standards and greater understanding and acceptance of their purpose.

Current Events

The ENose knows

Onboard the space station, ammonia is a good thing. It flows through pipes, carrying heat generated inside the station outside to space. Ammonia helps keep the station habitable. The problem is it is also poisonous. If it leaks, astronauts need to know quickly. The problem is ammonia becomes dangerous at a concentration of a few parts per million (ppm). Humans however, can't sense it until it reaches about 50 ppm. On the shuttle and space station ammonia is just one of about 40 or 50 necessary compounds which cannot accumulate in a closed environment.

What if an electrical fire breaks out? The increasing heat releases a variety of signature molecules. Humans can't sense them either until concentrations become high.

Because of all these reasons, NASA decided to develop an electronic nose, or ENose. It's a device that can learn to recognize almost any compound or combination of compounds. It can even distinguish between Pepsi and Coke. Like a human nose, the ENose is versatile, yet it's much more sensitive. "ENose can detect an electronic change of 1 part per million," said Dr. Amy Ryan who heads the project at NASA's Jet Propulsion Laboratory. She and her colleagues are teaching the ENose to recognize those compounds—like ammonia—that cannot accumulate in a space habitat.

The ENose uses a collection of 16 different polymer films. Researchers designed these films to conduct electricity. When a substance—such as the stray molecules from a glass of soda—is absorbed into these films, the films expand slightly, and that changes how much electricity they conduct. Because each film is made of a different polymer, each one reacts to each substance, or analyte, in a slightly different way. And, while the changes in conductivity in a single polymer film wouldn't be enough to identify an analyte, the varied changes in 16 films produce a distinctive, identifiable pattern.

Electronic noses already see use here on Earth. In the food industry, for example, they can detect spoilage. There's even an electronic tongue, which identifies compounds in liquids. NASA's ENose needs to be able to detect lower concentrations than these devices. Right now, Ryan is working on a stand-alone version of ENose. "Everything is in one package," she said. The package includes polymer films, a pump to pull air (and everything in the air) through the device, computers to analyze data, and the energy source. They could post the noses at various points around the habitat, much like smoke detectors.

For related information, go to *http://www.isa.org/sensors*.

Mist Deposition in Semiconductor Device Manufacturing

P. Mumbauer, M. Brubaker, P. Roman and R. Grant, Primaxx Inc., Allentown, Pa.; K. Chang, W. Mahoney, D.O. Lee, K. Shanmugasundaram and J. Ruzyllo, Department of Electrical Engineering and Nanofabrication Laboratory, Penn State University, University Park, – Semiconductor International, 1111/2004

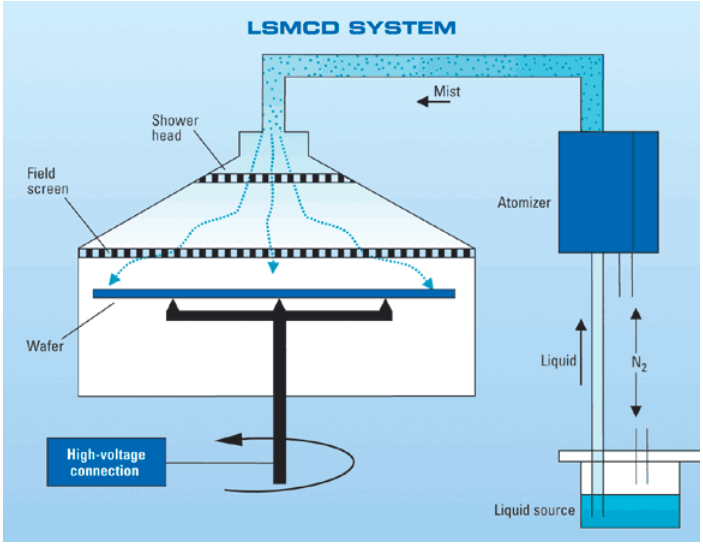
Liquid precursors are commonly used in semiconductor processing. A liquid source can be converted into gas that will then act as a reactant in chemical vapor deposition processes such as metal organic chemical vapor deposition (MOCVD). Alternatively, viscous liquid precursors can be physically applied to the wafer surface and then solidified by thermal curing. Mist deposition is a method of covering solid surfaces with liquid precursor that is free from inherent limitations of spin coating and other techniques discussed.

In general, the idea behind mist deposition is to convert liquid source material into a very fine mist, which is then carried by nitrogen to the deposition chamber where sub-micron droplets coalesce at room temperature on the wafer, covering its surface with a uniform film of viscous liquid. The film is then subjected to thermal curing during which the solvent evaporates, leaving on the surface a thin layer of solid. A schematic diagram of the commercial system implementing mist deposition is shown in Figure 1 (next page) . A liquid precursor is supplied in a stainless container from which it is flowed into the atomizer by nitrogen pressure. An atomizer liquid is converted into a very fine mist through interactions with a series of impactors. The average size of the droplet in the mist is ~0.25 µm, but can be smaller for a different impactor configuration. The mist is then carried by nitrogen into the deposition chamber where it coalesces on the surface of a slowly (10 rpm) rotating wafer at room temperature and a pressure very close to atmospheric.

To control deposition rate beyond gravitational interactions, which in the case of submicron-sized droplets are very weak, an electric field is created between the grounded field screen and a wafer (Fig. 1). After deposition, the film is thermally cured at a temperature of 160-300°C in ambient air or in the controlled ambient of either oxygen or nitrogen at atmospheric pressure. In the case of some inorganic materials, wafers may also be subjected to an additional anneal typically in the temperature range of 600-800°C either in nitrogen or in nitrogen with some oxygen added.

for the rest of the article, go to: http://www.reed-electronics.com/semiconductor/article/CA476294?nid=2012

Current Events



Schematic Diagram of Mist Deposition Apparatus

Calendar

- Electrostatics 2005, June 15-17, 2005, Helsinki, Finland, Contact: *electrostatics2005@congreszon.fi* , website: *http://electrostatics2005.vtt.fi/*
- ESA 2005, June 21-24, 2005, University of Edmonton, Alberta, Canada. Contact: Angela Antoniu, antoniu@ece.ualberta.ca (Abstracts due Feb. 25)
- 15th IEEE Int'l. Conf. on Dielectric Liquids, June 26 - July 1, 2005, Coimbra, Portugal Contact: *electrostatics2005@congreszon.fi* , website: *http://www-lip.fis.uc.pt/~icdl2005*
- IEEE Electrostatic Processes Committee 2005 Annual Meeting, Oct. 3-7, 2005, Hong Kong China, Contact: Prof. Malay Mazumder, mkmazumder1@ualr.edu (Abstracts due Jan. 15)
- Electrical Insulation Conference (EIC), Oct. 24-26, 2005, Indianapolis, Indiana, USA, info: *http://www.deis.nrc.ca/eic2005/eic2005.htm*

Electrostatic Profiles

George Suthes

Working with Flextronics Malaysia for 3 years.

Working experience : 10 years [in ESD 6 years]

Team member in establishing ESD control procedure for Flextronics worldwide and representing Flextronics Asia in ESD's .

Working with customers such as HP, XM Radio, Xerox, Motorola, Infocus, and Sony-Ericsson.

Larry R. Holcomb

I am 54 years old. I live in Orlando, Florida. I service electrostatic lubricators in can and closure facilities.

LOOKING FOR A FEW MORE BRAVE SOULS: Please take advantage of this opportunity to introduce yourself to the rest of the ESA members and help keep the friendliness growing. Please send your profile to me at *mark.zaretsky@kodak.com* .

Society News

ESA Officers

President:	William Vosteen, Monroe Electronics
Vice President:	Kelly Robinson, Eastman Kodak
Executive Council:	Sheryl Barringer, Ohio State Univ.
	John Gagliardi, Rutgers Univ.
	Mark Zaretsky, Eastman Kodak

Email Addresses Requested

We would like to include member's current email addresses in our updated roster. Please send your current email address to me at *mark.zaretsky@kodak.com* . Also, please indicate if you would like to receive electronic notification of the newsletter (found on our website *http://www.electrostatics.org*) rather than a hard copy in the mail. Thank you for taking the time to send this information.

Missing Newsletter Issue

Yes, I confess - I did not issue a newsletter for Sept./Oct. My apologies once again go out to the membership. I truly appreciate the efforts of Bill Smart, previous newsletter editor, for having been so consistent for so many years. Please feel free to send your complaints/suggestions to me or Bill Vosteen.

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