

# The right blend of R & D

The third Coatings Science International Conference in Noordwijk, Netherlands

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The third Coatings Science International Conference took place from 25 to 29 June in Noordwijk, Netherlands, and was again well supported by some 114 attendees. Thirty-three technical papers plus poster presentations from university and industrial coatings research offered an interesting overview of the current state of scientific developments.



Interested yet sceptic attention during the lectures...

It is difficult to coax R&D managers from the coatings industry or their suppliers away from their daily business to attend a technical conference for almost a week – but it would seem that Coatings Science International (CoSi), whose mission is to seek an intensive exchange between academic and industrial coatings research, is well able to manage this feat. For the third time, an illustrious group of coatings researchers convened at the conference in Noordwijk, defying an initially tempestuous North Sea landscape, and most participants indeed remained there from start to finish, albeit supported by mobile phones and laptops, of course.

The 33 technical presentations organised by the committee constituted a varied program that also happily struck a very good balance between academia (16) and industry (17). Also, among the industrial papers themselves, there were roughly equal numbers from paint manufacturers and their suppliers alike – once again, the blend was very good.

## Greater industrial presence

The same could also be said about the composition of the conference audience, with numbers up slightly in comparison

with the predecessor event, but which was above all more international: there were delegates and speakers from 22 countries. Representatives from the Netherlands (40) and Germany (22) were still clearly in the majority, but the proportion of non-European participants at 22 (including 9 from the USA, 5 from South Korea, 3 from Japan, 2 from China) was markedly higher than in previous years. Like the blend of speakers, the proportion of industrial participants was higher than in 2006, at 56% (more precisely: 27% raw material manufacturers, 19% paint manufacturers, 9% OEMs and others), relative to 44% from academia.

The organising committee was essentially unchanged – the only differences being that Dr. *Johannes Benkhoff*, Ciba, succeeded his colleague Dr. *Godwin Berner*, and Dr. *Catherine Dekerckheer* from the Belgian Institute Meurice took the place of the late *André Toussaint*, who passed away unexpectedly recently.

With a few exceptions and only sometimes hampered by linguistic barriers, the technical papers were of the envisaged high calibre, and, as so typical of CoSi, were debated intensively in plenary sessions. Some of the particularly interesting contributions are presented below:

## Binders produced by controlled free-radical polymerization?

*Jürgen Omeis* (Byk Additives and Instruments) opened the conference by reviewing the different methods of controlled free-radical polymerization and their scope for industrial production of all kinds of precisely defined block copolymers. In the coatings world, these methods have been exclusively applied by industry to polymeric dispersing additives, but they are on the verge of finding applications for binder polymers as well, as was also demonstrated by *Sheau Hwa Ma* (DuPont Marshall Research Laboratory), who presented the first new block copolymer binders for solvent-borne two-component-polyurethane coatings.

## Diluent lowers VOC content in high-gloss alkyds

In his excellent lecture, *Rob Jans* (Akzo Nobel Decorative Coatings) presented a new reactive diluent class for alkyd coatings. He first examined the requirements imposed on such a diluent and then presented the new product. This is a polymeric, diol-extended unsaturated polyester, which hardens very well in high gloss

alkyd coatings and permits the VOC content of such formulations to be substantially reduced.

## New antifouling silyl acrylate binders

Mark Plehiers (Sigma Kalon) followed this with new, hydrolysable silyl acrylates that can be used in self-polishing antifouling marine paints (the slow hydrolysis of the binders in sea water makes for controlled biocide release while keeping the coating surface smooth). For the first time, said Plehier, some of the new compounds can combine good hydrolytic properties with the non-stick properties of a polysiloxane, and that increases the antifouling performance.

## News on UV car refinishes

Keimpe van den Berg (Akzo Nobel Car Refinishes) reported on Akzo's development of aqueous, UV-A-curable automotive repair clear coats. To this end, new acryloyl or maleimide polyurethane dispersions have been developed, which have a relatively low molecular weight, a high level of C=C functionality and an optimized proportion of polyethylene oxide – properties which are necessary for good levelling and an excellent appearance, emphasized van den Berg.

## Thermal hardening of acrylates without peroxides

An alternative to peroxides as initiators for heat-curing of acrylate coatings was presented by Dr. Katia Studer (Ciba). This new class of thermal free-radical initiators consists of sterically hindered N-acyloxyamines that exhibit good reactivity (on a par with that of benzopinacol, but somewhat inferior to benzoyl peroxide) and can avoid the disadvantages of peroxides (explosiveness, inclination to premature gelling).

## Coatings age purely physically, too

Professor Stuart Croll (North Dakota State University) gave a highly interesting insight into his research on an aging phe-



...as well as intense debates during breaks: Professor Tsuginori Inaba (left), Chuo University, Japan, and Professor Akira Matsumoto, Kansai University

nomenon that, for some reason, the coatings world apparently has observed only very little. As Croll explained, apart from the familiar decomposition and decay reactions of binders and other components exposed to oxygen, chemicals or sunlight, the aging process in coatings can be also caused by a purely physical mechanism that can contribute considerably to the decay of coating properties. Originally suggested by Belgian CoRI researcher Dan Pereyra, such physical aging consists in slow structural changes in a polymer below its glass temperature towards its thermodynamic equilibrium – much in the way that inorganic glass ages over centuries by crystallizing. In polymers, this quasi-crystallisation process can increase embrittlement, although the cross-linking density decreases at the same time due to chemical decomposition processes. Croll showed that variations in temperature of the kind that occur in nature are of major significance – and that weathering tests usually cycle their temperatures too quickly for this effect to be simulated. This could be one reason why many accelerated weathering tests often correlate poorly with their open-air counterparts.

Coatings Science International 2008 will take place on 22.–26. June 2008, again in Noordwijk. A Call for Papers will be launched shortly, further information can be found at

[www.coatings-science.com](http://www.coatings-science.com)

The proceedings of this year's conference will be published in a special edition of Progress in Organic Coatings, presumably in January 2008.

## Predicting shapes of multi-phase latex particles

Jeffrey Stubbs, DSM Neoresins, USA, presented his analytical studies of morphological development in multi-phase latex particles. Stubbs has developed a method that reliably predicts such morphologies – from core shell particles to large or small inclusions in latex particles right up to lobular shapes – depending on the experimental conditions of emulsion polymerization. He presented a flow chart of the method. The organising committee singled out his paper at the end of the conference for the "Science Award" for the best scientific paper.

## Encapsulated powder coatings crosslinkers

Once again, the conference poster event, at which primarily the universities presented their research results, proved very interesting and was used for intense discussions. Three contributions were honored by the OC as particularly interesting and worthy of the conference's "Creativity Awards." These were the poster by Tamara Dikic (TU Eindhoven), which presented her work on replenishing fluorinated ultra-hydrophobic coatings, that of Daniela Senatore (TU Eindhoven), who incorporated liquid encapsulated crosslinkers into powder-coating formulations to achieve greater separation between the levelling and curing reaction during heating of the applied coating, as well as that of Catarina de Carvalho Esteves (University of Alveiro, Portugal), who developed strategies towards the in-situ polymerisation of inorganic-polymer nanocomposites in aqueous media. ■