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Phosphorus, Inorganic & Nitrogen Flame Retardants Association

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Bringing the plastics industry together

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FIRE RESISTANCE IN PLASTICS 2016

Cologne, Germany, 6-8 December 2016

*This special edition of the **pinfa Newsletter** presents the 11th AMI "Fire Resistance in Plastics" conference, 2016, summarising presentations and illustrating with interviews of a number of conference participants.*

*Takeaways from the conference and networking are that there is today a large potential for **development of PIN flame retardants**, in developing countries as **fire-safety standards** are improved, and in developed countries in response to new requirements for **lower smoke density and toxicity**.*

*The conference showed the **high level of innovation and the close cooperation** between FR producers, polymer providers, compounders and masterbatch developers, to provide safe PIN FR solutions compatible with demanding material requirements such as processing, electrical performance, colour, weatherability, recycling, transparency and aesthetic quality.*

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The **11th AMI "Fire Resistance in Plastics"** conference, Cologne, 6-8 December 2016, brought together polymer manufacturers, compounding and masterbatch companies, polymer user industries, and flame retardant (FR) producers and technology experts. Registrations were up nearly 10% from 2015, showing the strong interest in fire safety amongst polymer suppliers and users. Participants were from more than 20 countries across the world, with a strong participation from Asia.

Next year's AMI Fire Resistance in Plastics will take place in Cologne 5-7 December 2017 and Fire Retardants 2017 in Pittsburgh, Pennsylvania, 25-26 April www.amiconferences.com

Challenges for flame retardants

Noru Tsalic, conference Chair, hands the award for the "best question" to Sabayasachi Gaan

Noru Tsalic, AMI (Applied Market Information), the conference organisers, reminded of his message from the 2015 conference: fires continue to cause deaths and injuries in developed countries, with an even greater challenge in developing countries (60 000 fire deaths per year in India alone). Increasing use of polymers and fibres in homes and offices, and increasing presence of miniaturised electronics, increases both the potential fire load and the risks. The flame retardant industry has been successful in proposing fire safety solutions with better health and environment profiles, and dialogue is effective with policy makers in developed countries to take decisions based on science.

Mr Tsalic therefore sees as two big challenges:

- Improve the image of flame retardants with consumers: move from fears about chemicals, to a positive understanding of the importance of fire safety. Make "Fire proof" a selling point, relating safety to quality and luxury.
- Develop and implement fire safety standards in developing countries

Already, there are increasing opportunities for flame retardants in developing countries: Western brands implement their global safety standards in all countries in which they sell, equipment manufacturers in Asia implement Western safety standards in order to be able to export, government prestige "showcase" projects often set best-of-class safety requirements, luxury brands (including upmarket housing and offices) generally also require demanding safety standards.

An increase in per capita spending on flame retardants from 0.7 to 1 US$ in developing countries (compared to over 2$ in Europe and over 4$ in North America) would generate 1.4 billion US$ market growth for flame retardants.

Maryline Desseix, PolyOne, explained why flame retardants are essential to protect lives and property. A video from Lancashire UK Fire Services shows how flashover can develop in less than three minutes in a home, even when materials comply with fire safety standards, whereas fire services take around 8 minutes on average to arrive. We all want fire-safe products, but we all also want the flame retardants in products around us to be safe to our health, our children, and the environment. With that in mind, PolyOne is developing new products and screening strategies to identify and test new flame retardants addressing the crucial factors of a fire risk scenario, such low smoke and flame, heat release and smoke toxicity. The efforts are focused on non-halogenated materials. Ms. Desseix considers that regulation can and should continue to push industry in this direction. Key challenges are designing flame retardants on a case-by-case basis, based on polymer structure and properties, to optimise performance and reduce smoke density, which can vary widely depending on material properties and fire conditions.

*Interview: **Noit Shahar, Kafrit***

Noit Shahar, Kafrit Israel, expects growing demand for flame retardants in developing countries, particularly in buildings, transportation and injection molding (electronics, engineering plastics). Fire safety standards for construction materials are becoming more demanding, including requirements for low smoke, heat release and toxicity. This leads to new requirements for flame retardants in different and new applications, such as water protection membranes in roofing, corrugated pipes, wall and flooring materials and interior decoration fibres. Kafrit provides unique solutions by designing its products to answer the following challenges: good price performance, ability to fulfil a number of standards, suitable for more than one application and without any impact on other material application properties. Kafrit works with suppliers to develop the right message to promote fire safety and so to convince end customers of the added-value of flame retardants..

Kafrit Industries www.kafrit.com is a leading compounder and masterbatch producer, based in Israel, and supplying polymer applications worldwide, in particular polycarbonate sheet and film and flame retardant applications

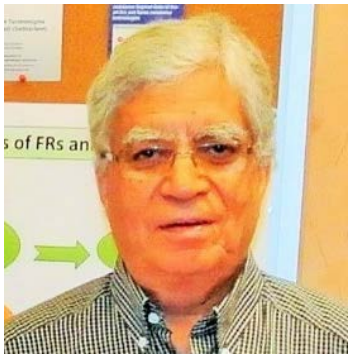
*Interview: **Jacob Scherf, Polymer Asia***

Jacob Scherf and **Nguyen Thi Kim Quy, Polymer Asia** Vietnam, explain that product manufacturers in Vietnam are mostly multi-nationals, producing for export, and therefore implement Japan, EU and US quality and fire safety requirements. Korean or Japanese construction companies building in Vietnam apply their own high materials standards. Vietnam itself can be expected to tighten its own fire safety regulations in coming years. These trends result in a growing and technically demanding flame retardant sector in South-East Asia, in particular for ABS and polyamides. Key requirements are UL94-V0 and LSZH (low smoke zero halogen)). This AMI conference enabled understanding of international trends in fire safety standards and in PIN flame retardant developments which can be expected to drive forward the South-East Asia market in the future.

Polymer Asia www.polymerasia.com combines European and Japanese backgrounds with ten years experience of compounding and masterbatch production at two sites in Vietnam, serving international customers in particular in cables. E&E and automobile.

Innovations in PIN FR applications

Ugo Zucchelli, Italmatch, presented inorganic phosphate salt PIN FRs (proprietary phosphinates) in polypropylene, polyethylene EVA. These PIN FRs act in both the solid phase (formation of protective char layer) and by releasing phosphorus radicals into the fire gases. By including phosphorus in different oxidation states, faster char formation, improved intumescence and a better barrier to gas transfer through the char layer are achieved. UL94-V0 was achieved with glass fibre reinforced polypropylene, with unchanged colour and low corrosivity in processing (no release of acids). Challenges are the tendency of the inorganic salt to take up water, and so loss of fire safety or material mechanical properties.



Bensi Kaul, MCA Technologies, underlined the need to look carefully at the real cost impacts of flame retardant use. In some cases, weight is critical for plastics, in others it is wall thickness. Mr. Kaul considers that organic and non-halogenated FRs are therefore advantageous, because they enable lower density. In electrical applications, non-ionic FRs are further preferable, to avoid deterioration of electrical resistance. He presented tests showing that MCA's PPM-triazine (nitrogen containing polymer) can act in polyamides, PBT, polypropylene as an effective synergist with ammonium polyphosphate (including siloxane coated), melamine polyphosphate, DEPAL, reducing required loadings, improving char production, better plastic mechanical properties and reducing smoke release. One mechanism is the formation of oxynitrides during fire, which contribute to char stability.

Jan-Pleun Lens, FRX Polymers, presented the use of the company's polymeric phosphonate (phosphorus PIN) flame retardants in a range of polymers: PET, epoxy, polyurethane foam and polycarbonate. The products are available as polymers, functionalised oligomers and carbonate co-polymer, for different applications. Because of their large molecule size, they offer high compatibility with polymer processing, and do not migrate out of finished products. Properties in polycarbonate include high transparency (use in lighting applications), low smoke density and high fire performance in thin films and self-extinguishing with glass fibre reinforced polycarbonate. The company continues to further improve the hydrolytic and heat stability of its products.

Alberto Frache, Politecnico di Torino, presented investigations into flame retardancy of highly filled plastics, in particular polypropylene. He tested different combinations of calcium carbonate, talc and magnesium hydroxide, concluding that intumescent flame retardants can be incompatible with calcium carbonate, and that magnesium hydroxide can improve the mechanical properties and material stability. Also, PPM-triazine can be used to replace a part of the filler, with comparable mechanical and fire retardant properties. Finally he stressed the importance of studying the mechanisms of interaction between FR and fillers.

Interview:
Shin Nakamura and Shinichi Ikoma, Daihachi Chemical

Shin Nakamura and Shinichi Ikoma, Daihachi Chemical Japan, underline that FRs must address fire performance, smoke emissions and toxicity. The company's phosphorus-based PIN FRs are developed to not generate problematic smoke emissions. User confidence in FR solutions is important and is achieved by working closely with polymer suppliers and developing health and safety data, via REACH. Daihachi is developing new phosphorus PIN FR solutions and compatible transparent plasticizers for engineering plastics, resins and fibres. This AMI conference has provided them with valuable insights into PIN flame retardant development trends and understanding of customer requirements for PIN FRs solutions.

Daihachi Chemical Industry www.daihachi-chem.co.jp/eng/ are specialised in non halogenated flame retardants, with a strong market position in the Asia and Pacific regions, and are now launching products into the European and Americas markets.launching products into the European and Americas markets.

*Interview: **Jasmin Seebade, VELOX***

Jasmin Seebade, VELOX Germany, sees market developments for flame retardants driven by increasingly demanding fire safety standards, both in developed and developing countries, through both regulatory requirements and through industry standards. However, this leads to increasing testing costs as regulations are not harmonised, whereas at the same time industries are looking for cost savings. Downstream users want non-halogenated (PIN) flame retardants that offer flexibility and performance but are not always aware of new or upcoming low smoke and low smoke toxicity requirements which PIN FRs can address. VELOX works to understand each product's real product safety requirements, not simply passing one fire test, and then works with customers to develop adapted FR solutions and to demonstrate the product added value. Promising new application areas include synthetic and natural rubbers, resins and polymer composites.

VELOX, www.velox.com is a European leader in distribution and marketing of specialities for plastics, paints and coatings , additives and composites with 18 offices in Europe, Russia, Turkey and China.

Durability of FR polymers

Günter Beyer, Kabelwerk Eupen, summarised current knowledge on how materials fire performance can change with ageing. Ageing can see breakdown of polymer molecules into shorter chains, leading to lower viscosity and so deteriorated fire performance. On the other hand, migration of fillers or low molecular weight additive flame retardants to the polymer surface can actually improve fire performance. Tests showed that LS0H (low smoke zero halogen) flame retardant cables, formulated using PIN flame retardants (combination of aluminium tri hydrate and nanoclays) maintained their fire performance and quality of char formation during ageing, continuing to pass Construction Product Regulation class Cca-s1-d2 (low smoke).

Stefan Ultsch, DOW Chemicals, discussed developments enabling to meet most demanding infrastructure and transportation standards with environmentally-friendly polyolefin elastomer formulations. Today, products must meet not only fire safety standards (flammability), but also smoke and toxicity requirements, sustainability and recycling objectives. PIN flame retardants enable lower smoke density and toxicity. DOW has developed a formulation toolbox from novel polyolefin elastomers, stabilisers and crosslinking agents, UV and weathering protection, colour and other additives and bespoke combinations of PIN flame retardants and synergists. DOW uses PIN FR solutions including inorganic FRs (magnesium dioxide, aluminium tri hydrate) in leading edge compounds. Longevity and weathering is an important challenge for infrastructure applications, with a range of demanding specifications. These require very high levels of FR purity, to avoid introduction of elements which will, over time, catalyse polymer or additive deterioration.

Yutaka Yonezawa, Adeka, presented non halogenated FRs systems for exterior applications of polyolefins, such as polypropylene. These PIN FR solutions act by intumescence, creating a protective layer which shields the polymer from heat and prevents diffusion of the pyrolysis gases necessary to feed fire. The PIN FRs offer lower smoke release, reduced smoke toxicity, and additionally do not deteriorate HALS (hindered amine light stabilisers), so enabling to maintain UL94-V0 after 3 000 hours of weathering.

Interview: ***Rolf Albach, Covestro***

Rolf Albach, Covestro Germany, explained the importance of demanding fire safety standards for rigid foam building materials. Rigid polyurethane (PUR, PIR) and polycarbonate foams are increasingly used in building interiors, claddings, roofing and under-floor, to provide best-class thermal insulation, enabling important energy savings in both heating and air conditioning. Because they are structural, they enable optimal building design: for example on flat roofs they can be walked upon, allowing installation of photovoltaic and other technical installations. To ensure safety, fire standards for construction foams in buildings should require fire resistance both when the foam is behind protective materials (e.g. plasterboard) and also when foam is exposed, because of risk of ignition during storage or installation or when protection is holed during building modifications. Mr Albach considers that liquid form, gas-phase acting PIN flame retardants need to be developed for these construction foams, to replace halogenated FRs whose use is being questioned. Such FRs can act in synergy with polyurethane, melamine and additives to provide charring and to reduce smoke emissions.

Covestro, www.covestro.com is a world leading polymer manufacturer, offering a range of application solutions. The company has 30 sites in Europe, Asia and the Americas. Covestro produces polyurethane (PUR), polyisocyanurate (PIR) and polycarboxylate rigid foams, as well as flexible foams for furniture and bedding.

Eli Shulman, TOSAF Group, summarised the challenges and solutions found to provide fire-safe (UL94-V0) seats for sports stadiums, where UV resistance, weathering and colour stability are essential. This involves the combination of polymer, flame retardant, colour pigment, light stabilisers and other additives. TOSAF's systematic study of various flame retardant and stabilizer performances resulted in development of optimal FR-UV packages that has satisfied demanding criteria fixed by FIFA, national sports federations and purchasers, with to date no problems of de-coloration encountered in installed seating, even after a number of years. Selected flame retardants need to be low-polarity (not migrate) and not emit acids under weathering (deactivate HALS light stabilisers). For the latter reason, TOSAF has developed a solution based on PIN FR which is not phosphoric acid based and which allows to preserve UV stability as well as FR properties in varied polypropylene applications..

Developing alternative flame retardants

Marc Leifer, ICL-IP, presented innovative FR solutions for polycarbonates and blends, considering both phosphorus and bromine based systems. He demonstrated PC applications with excellent fire safety at low thicknesses, while keeping high transparency and low haze. The complexity of selecting the right flame retardant was explained, with numerous solutions performing differently depending on material thickness, blended polymers (PBT, ABS, PET, PLA) and affecting differently the material properties such as impact, strength, light transmission, moldability. Polymeric Brominated solutions without ATO (antimony trioxide) synergist show good performances in ICL SAFR® Hazard and Exposure assessment. Addition of impact modifiers improve mechanical properties.

Interview: ***Butra Boonliang, SCG Chemicals***

Butra Boonliang, SCG Chemicals Thailand, expects fire safety regulators to impose new regulations in Thailand in areas such as transportation and construction. In the future, new developments from Europe such as low smoke toxicity requirements are expected to be adopted in the rest of the world. These changes combined with market advancements create new requirements for flame retardants. Singapore is developing as a servicing hub for airlines, leading to demand for high performance, low smoke flame retardants. Inter-connexion of high speed railways and of cargo services result in fire safety standards being harmonised upwards. The ideal flame retardant should be flexible for different polymer applications, easy to process, retain material performance and cost-effective. Market segments have different requirements, but there is a general trend to avoid halogenated FRs because of end-of-life issues and acid smoke gases.

SCG Chemicals, www.scgchemicals.com is launching the CIERRA-FR range of PIN flame retardants in the European market. These products ensure delayed ignition, reduced heat release, no acid smoke contribution, and uniform char formation.

Manfred Doering, Fraunhofer LBF, presented an innovative proposed solution to enable effective non-halogenated flame retardancy of expanded polystyrene foams. Current PIN FR solutions (such as melamine, sulphur S_8, phosphorus compounds) do not prevent flammability in the SBI corner test (chimney effect) and do not prevent melt-drip. The proposed technology, now available as XFLAM, coats the expanded foam beads in inorganic PIN flame retardant (water borne resin solution) before pressing into foam panels. The resulting panels offer improved mechanical and insulating properties, and can be recycled by mechanical milling.

PIN FR solutions for low smoke, low smoke toxicity

Eric Guillaume, Efectis France, presented developments in safety standards for smoke toxicity. Smoke is the main killer in fires, and deaths due to smoke have not fallen as rapidly in developed countries as those due to burns. Assessing smoke toxicity is however very complex. Some toxicants are considered for their acute effect, i.e. effects on occupants during fires and others are considered for their chronic effects, i.e. for firefighters. Penetration can be via inhalation or through the skin, and the exposure scenario is a key point (duration, intensity). Gases with acute toxicity are, most importantly, carbon monoxide; in some circumstances hydrogen cyanide, carbon dioxide; and to a lesser extent hydrogen chloride, bromide and fluoride, sulphur dioxide, nitric oxides, aldehydes, ammonia and others. Gases with chronic effects are mainly aromatic hydrocarbons (e.g. benzene, phenol, toluene, styrene), PAHs (polycyclic aromatic hydrocarbons) and organo-halogens (dioxins / furans). Scenarios and models for tenability and lethality assessment differ. Consequently, there are many different standards for measuring smoke toxicity in different applications (cables, railways, marine …), as well as standards for smoke opacity and smoke acidity. Assessment should be made at the end-use scale, because smoke toxicity is a scenario-related parameter driven by fuel as well as ventilation conditions. Fire safety engineering is the proper tool for such assessment.

Interview: ***Ioana-Elena Mihailescu, Evonik***

Ioana-Elena Mihailescu, Evonik Resource Efficiency Germany, sees growing demand for new flame retardant solutions in cables, electronics (e.g. personal computer parts), construction and automobile. Product manufacturers want safety, including a range of properties such as fire safety and low smoke emission, low chemical toxicity and product safety in use (e.g. hygiene - cleaning). The ideal flame retardant should act by mechanisms which do not increase smoke toxicity, in particular by mechanisms such as water release and char **formation**. For this, good dispersion in the polymer is important. Silanes offer fire safety synergy and contribute to reduced smoke emission, in combination with PIN flame retardants, as well as coating quality properties and processing improvements.

Evonik, http://corporate.evonik.com/en/ is one of the world's leading specialty chemicals companies. Evonik concentrates on high-growth megatrends, especially health, nutrition, resource efficiency and globalization. Evonik Resource Efficiency supplies materials for environment-friendly and energy-efficient systems including e.g. polymers, fillers and organosilanes for the surface modification of fillers, pigments, metals, etc.

Hendrik Wermter, Chemische Fabrik Budenheim, presented results with their new PIN FR systems. These systems are mainly based on melamine polyphosphate and a recently developed polymeric DOPO-derivative (organo-phosphorus PIN FR). The new PIN FR systems are especially designed for GF (glass filled) engineering plastic application. In glass filled PA-6 and PA 6.6, UL94-V0 (0.8mm) at 20 – 23% loading combined with very good GWIT (>800°C) results (glow wire ignition test) have been achieved. The observed smoke toxicity was very low (3-8 times lower than standard under DIN 5510-2). Compounders show high interest in this new PIN FR system due to its very good processing properties i.e. good thermal stability and especially low corrosion.

Yann Bourgeois, Huber Engineered Materials, presented testing of different combinations of commercially available PIN flame retardants in polyamides for railway electrical applications. FRs tested were: melamine poly(zinc) phosphate, melamine poly(magnesium) phosphate, magnesium hydroxide (amino silane surface treated), aluminium phosphinate (DEPAL), zinc borate, zinc phosphate complex. A combination of these (without using borate) achieved UL94-V0, 600V GWIT (glow wire ignition test) and considerably reduced smoke, enabling to meet the EU Railway standard EN 45545 R22 – HL3. Zinc phosphate complex showed to be effective in reducing smoke toxicity, in particular by chelating nitrogen species generated by the polyamide. Melamine poly(zinc) phosphate, magnesium hydroxide and DEPAL combinations display interesting synergistic effects through the improvement of charring, the development of a strong intumescence or high CTI values (comparative tracking index).

Making FRs safer and more sustainable

Rien Repriels, Campine, presented work to compare ATO (antimony trioxide) as a synergist for halogenated FRs with alternative synergists. ATO does not pose a cancer risk by inhalation if formulated/delivered in a non-respirable form/system, but on the other hand customers want fine product for optimal dispersion. This can be addressed by supplying granules, wetting or the use of dust-free bags. Alternative synergists (borates, organic additives, stagnates, silicones) were tested in PVC, polyethylene with brominated FR, polyamides with brominated FR, but did not match the fire performance of Campine's "MT" ATO product. However, these other synergists could be combined with ATO, to obtain in addition to the excellent flame retardant properties of antimony trioxide, reduced smoke emissions or create intumescent layers.

Sabayasachi Gaan, EMPA St Gallen, presented applied research into DOPO derivatives as PIN FRs in PU, polyamides, PET and PET/PBT, looking at fire performance, processing and health and safety profiles. Depending on how DOPO is derivatized (i.e P-C, P-N, P-O derivatives), fire performance and processing properties can be modified to adapt to different polymers, in particular thermal stability for processing. This can facilitate material stability during recycling. Results presented include mechanical properties when used in different polymer fibres and engineering plastics, showing fire performance at relatively low loadings (10% FR). A range of studies show a positive health and environmental properties show (see Hirsch et al. 2016, summarised in pinfa Newsletter n° 73). The REACH registration dossier one of these new DOPO derivatives, EDA-DOPO, is now under preparation.

Fouad Laoutid, Materianova, made an up-to-date overview of development of bio-based flame-retardants. This responds to demand for bio-based fire safety solutions for bio-based polymers (such as poly lactic acid PLA, bio PET, bio polyethylene …), in order to offer a coherent "green" image product. Bio-based PIN FRs shown to be potentially effective include, to date, DNA (from fish processing wastes), and derivatives of phytate, lignin, tannin. Phytate is a phosphorus storage molecule in seeds and plants, but is not digestible for non-ruminants. Its salts with sodium or aluminium show effective flame retardancy by rapid char formation in PLA. Lignin or tannin can be chemically phosphorylated or combined with metal ions, phosphorus, with other additives (phytate or clays) to produce effective flame retardant additive systems. Further work is necessary on the life cycle assessment (including end-of-life recycling), the scale up of industrial production (including developing reliable and quality consistent sources of these bio-materials) and on the durability and ageing of these bio-based PIN FRs in bio-polymers. For further information on bio-based FRs, see pinfa Newsletter n°65 summarising the ECOFRAM conference 2016.

Interview: ***Simone Gatti, Radici***

Simone Gatti, Radici Italy, underlines the wide range of different requirements for flame retardants. Radici prefer to promote PIN flame retardants, because they consider them to be more sustainable and to open wider opportunities, but it is still difficult to substitute halogen FRs to meet some standards such as Glow Wire. Strong growth for PIN FRs is expected in E&E applications in technical and engineering polymers. Equipment manufacturers increasingly want to justify that their products are safe for users, and so fire safe. There is increasing demand for low smoke toxicity and low smoke opacity solutions, which PIN can meet, already in European in new railway and construction standards, and anticipated in the US "yellow card" requirements. Flame retardants should also offer sustainability, but criteria need clarification, and should cover avoiding migration, skin contact safety in use and low toxicity. Sustainability labelling and auditing should be defined.

RadiciGroup www.radicigroup.com is an internationally orientated, Italian chemicals group which fully controls its production chain, from adipic acid and PA6 and 6,6, to engineering plastics , including specialised performance polymer compounds for automotive and E&E.

Towards more efficient testing

Sophie Duquesne, Ecole Nationale Supérieure de Chimie de Lille, presented results of comparisons of small scale and large scale fire testing results on materials for cables, construction and transport applications. The objective is to develop small-scale testing processes which can reliably predict results in large scale testing, in order to enable rapid and cost-effective material screening. This work shows that scale-reduction is not straight forward, but that in some cases correlations can be found. Also, a new test of intumescent char integrity was developed.

Anna Rita de Corso, SUPSI Switzerland, also presented comparison between small and larger scale fire testing results, comparing the lab's specifically developed "mini SBI" (Single Burning Item) test to the standard SBI (EN13823). The "mini SBI" uses <0.4m^2 of material in a room corner (standard SBI 2.25m^2). Correlation to construction material Euroclasses is demonstrated. Further work is underway to improve the reliability of the "mini SBI" by adapting specimen mounting, burner, modelling.

Interview: ***Tanya Meredith, Sécheron***

Tanya Meredith, Sécheron Switzerland, presents the challenges faced by an equipment supplier in the rail sector, where fire safety and smoke limitation standards are very demanding. Sécheron selects materials suppliers who have proven competence in respecting railway materials specifications. Documentation required from new suppliers include REACH, RoHS, proof that halogen-free, and certification to the EU railway fire safety standards EN 45545. Key challenges are achieving smoke density standards and the absence of an agreed standard for "halogen free". A further difficulty is to manage the variation of rail and mass transit fire safety standards across the world (USA, Australia and Asia) although the EU standard is tending to be increasingly recognised. For Ms. Meridith, this AMI conference showed the complexity of flame retardant solutions and the high level of innovation in PIN FRs. This confirmed the need for end users (product manufacturers) to understand developments and keep ahead of innovation, in order to enable informed dialogue with material suppliers.

Sécheron www.secheron.com (Sécheron Hasler Group) design and provide high voltage AC/DC electrical components and installations for railway, metro and tramway installations, with 13 production sites worldwide.

Interview: ***Reimo Faber, SABIC***

Reimo Faber, SABIC, outlined the challenges of ensuring fire safety, with both low heat release and low smoke & toxicity, for high performance thermoplastic materials for mass transit applications. These markets are fast-evolving, and demand lightweight materials with very high material performance, design flexibility, reliability and aesthetic requirements. To meet these demands, SABIC engages directly in fire testing, to understand how FR systems are really working in different conditions and ensure that they robustly pass tests, not simply obtain certification. Fire standards have not been developed specifically for thermoplastics, and therefore typical behaviours such as intumescence, melting, deforming and shrinking leads to challenges to determine meeting requirements. Although there is no regulatory driver for PIN FR systems in mass transit, SABIC downstream users often want non-halogenated materials for environmental reasons, and this is a key objective of flame retardant – polymer system development. Additionally, FR-polymer systems should be compatible with industry material recycling.

Saudi Basic Industries Corporation (SABIC) www.sabic.com, is a global petrochemical company, and a major producer of polyethylene, polypropylene and other advanced thermoplastics. SABIC operates in more than 40 countries and manufactures in the Americas, Europe, the Middle East and Asia Pacific.