pinfa

Newsletter for non-halogen fire safety solutions

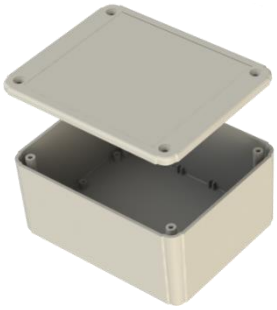
August 2014 – N° 44



Innovation

Italmach new PIN FR for ABS and styrenics

A range of innovative PIN flame retardant formulations, based on a new inorganic phosphinate and an organic phosphate, has been developed by Italmatch Chemicals Spa for ABS and styrenic polymers. The new grades are thermally stable during extrusion up to 270-280°C and achieve UL-94 V0 in ABS compounds, mass or emulsion grades, and show no blooming on final items or corrosion during molding. Specific combinations are developed for different polymers and applications in areas such as enclosures and housings, appliances, building profiles. The new FRs will be sold as part of the Phoslite® range, which is based on proprietary technology, launched in 2006 and already proven successful, especially for polypropylene UL-94 V2.



Italmatch Phoslite® http://www.italmatch.it/product04.asp?cat=3&codlineaprod=4

FRPM: understanding flame retardant developments

16 selected technical articles from the FRPM 2013 (Fire Retardancy and Protection of Materials, see *pinfa* Newsletter n°34 special edition) are published in Polymer Degradation and Stability journal. These articles offer up-to-date scientific information on areas such as materials fire safety strategies, fundamental materials fire safety science, smoke toxicity, flame retardancy of bio-based polymers and new flame retardant systems. All the papers addressing new flame retardant systems concern PIN FRs (phosphorus, inorganic & nitrogen) flame retardants, confirming the concentration of current R&D in this area.

Polymer Degradation and Stability, vol. 106, 2014, special issue based on the 14th European Meeting on Fire

Retardancy and Protection of Materials, ENSC Lille, France, July 2013 see pinfa Newsletter n°34

PIN FRs for polystyrene insulation: more work needed

The US Design for the Environment programme (EPA DfE) published its final report on alternatives to HBCD in polystyrene foams used for building insulation, concluding that there are presently only three viable flame retardant alternatives, all of which are brominated and one of which is itself polymeric. EPA expresses reservations concerning the health and environmental properties of these products, but considers them safer than HBCD, in particular the polymer. The development of industrially applicable PIN flame retardants, able to achieve required fire safety performance in polystyrene foams, and with positive environment and health profiles, is thus a major outstanding challenge for scientists and the PIN FR industry.

"EPA identifies safer substitutes for toxic Flame Retardants / identified chemicals are persistent, accumulate in the environment and have reproductive, developmental, and neurological toxicity", US EPA (Environmental Protection Agency) 12th June 2014 http://yosemite.epa.gov/opa/admpress.nsf/0/F943A4C163A5B8A785257CF500698492

EPA Design for the Environment (DfE) final report "Flame Retardant Alternatives for Hexabromocyclododecane (HBCD)" http://www.epa.gov/dfe/pubs/projects/hbcd/hbcd-full-report-508.pdf

PIN FRs for polyurethane foams: suitable alternatives

EPA has also published an updated version of the draft DfE report on alternatives to Penta-BDE in flexible polyurethane foams, identifying 18 industrially viable alternative FRs (of which most are PIN), providing detailed environment and health hazard assessments of each of these, but not generating conclusions. The EPA press release states "*Oligomeric phosphonate polyol* [marketed by *pinfa* member Clariant as Exolit® OP 560] *is identified as a safer alternative to pentaBDE. The pentaBDE report will help industry choose safer alternatives to meet product flammability standards for consumer products containing flexible polyurethane foam*."

"EPA identifies safer substitutes for toxic Flame Retardants / identified chemicals are persistent, accumulate in the environment and have reproductive, developmental, and neurological toxicity", US EPA (Environmental Protection Agency) 12th June 2014 http://yosemite.epa.gov/opa/admpress.nsf/0/F943A4C163A5B8A785257CF500698492

EPA "Flame Retardants Used in Flexible Polyurethane Foam", update information 12th June 2014 http://www.epa.gov/dfe/pubs/projects/flameret/about.htm and updated draft report http://www.epa.gov/dfe/pubs/projects/flameret/ffr-update-complete.pdf

High flexibility PIN FR compound for cables

Solvay has expanded its Cogegum® range of coss-linkable, halogen-free flame retardant compounds for power, data and signal cables used in transport, industrial and oil and gas applications. The silane-grafted Cogegum® 380 achieves marine and railway fire performance standards with compact charring which protects from burning. The compound offers 38 Shore D hardness, that is softer and more flexible than standard products on the market, which is important for use in narrow cables spaces in transport applications. The material is resistant to chemicals and oils, is treated to ensure UV resistance, improve cross-linking and ageing, and is rated for uses up to 95/105°C.

Solvay http://www.solvay.com/en/media/press_releases/Solvay_Cogegum_GFR_380.html

AEI performance cable polymer for marine and railways

AEI Compounds Limited UK, a leading supplier of polymer compounds for wire and cable, has launched a new silane crosslinkable, oil resistant, halogen-free flame retardant (HFFR) compound. SX0620 is a highly flexible, low smoke and fume sheathing compound for use in offshore, shipboard, industrial and railway cabling systems. SX0620 meets IEC 92-359 SHF2 and EN50264 EM104 and is adapted for demanding environments, such as in shipboard, offshore (OPG) marine installations, where zero halogen content and fire retardant properties contribute to crew and passenger safety. SX0620 is also suitable for use in heavy industrial applications and hostile environments where abrasion resistance is required.

See also AEI TP-0851 in pinfa Newsletter n°40 http://www.aeicompounds.com/news/view/140

TCO approves 11 PIN FRs, proposes to use GreenScreen

TCO, the health, environment and worker protection label, has published a list of 11 "Certified Accepted Substances" for sustainability certification for all information technology product categories. These are all PIN flame retardants and include inorganic PIN FRs (aluminium and magnesium based), nitrogen-phosphorus PIN FRs (amine, ammonium and melamine based) and phosphorus PIN FRs. This decision follows the launch in 2013 of an evaluation of PIN flame retardants (see *pinfa* Newsletter n° 32). TCO also proposes to use the GreenScreen™ assessment framework to identify other alternative flame retardants, in order to implement the TCO Development "Non-halogenated substances" mandate.

TCO "Update – Criteria review, non-halogenated substances" 14/4/2014 http://tcodevelopment.com/news/criteria-review-non-halogenated-substances-pre-draft-open-for-comment/

"TCO Certified Accepted Substances List" 16/4/2014 http://tcodevelopment.com/files/2014/04/2014-04-16-TCO_Certified_Accepted_Substance_List.pdf

Avocet PIN FR is Oeko-Tex accredited

Avocet, producer of performance fire safety products for textiles, has achieved Oeko-Tex ecolabel accreditation for Cetaflam® DB9. This PIN flame retardant for polyester textiles is used in the automobile, clothing, workwear, furnishings, curtains and decoration and public transport textile markets. The flame retardant is applied to polyester with a rapid processing time system, without use of binders or curing, enabling reduced energy consumption, and does not impact color shades or fastness. Compliance with the following fire safety specifications can be achieved: BS 5651, BS 5852, BS 5867, BS 7176, BS EN 1021, CAA Spec 8, art 2 Type, FMVSS 302, NFP 92 – 504 and NFPA 701

"Active approval for Avocet", Sustainable Nonwovens, 29th May 2014 http://www.sustainablenonwovens.net/index.php?option=com_content&view=article&id=12209:active-approval-for-avocet&catid=10:raw-materials&Itemid=32

More information: http://www.avocet-dyes.co.uk/products/flame-retardants/ and http://www.avocet-dyes.co.uk/products/flame-retardants/dyebath/limit/5/

Bio-based polyphosphonate PIN flame retardants

A phosphorus based PIN flame retardant (polyphosphonate) was synthesized from a biobased substrate (isosorbide, a sucrose-derived diol). This was tested as a flame retardant in PLA (poly lactic acid), a bio-based thermoplastic polymer derived from sugars and starches, which is now produced in commercial quantities as an alternative to petroleum based plastics. The bio-based phosphorus FR was tested at 0 – 15% dose levels in PLA and tested for thermal, mechanical properties and fire properties. UL94-V0 fire performance was achieved with 15% flame retardant and V2 at only 5% loading. The authors conclude that this combination offers a solution for using renewable, bio-based raw materials for producing durable goods conform to fire standards.

"Synthesis and characterization of isosorbide-based polyphosphonates as biobased flame-retardants", T. Mauldin et al., Polymer Chemistry 2014

New flame retardant solutions for stadium seats

Gabriel-Chemie Group, specialised in the refining and colouring of plastics, has achieved different fire protection standards for its MAXITHEN® PPSEAT masterbatch series using PIN flame retardants. The PPSEAT-formulation has achieved the Italian UNI 9177:1987 fire performance standard (Class 1) as well as the French fire protection standard NF P 92-507 (M2). Now the company meet not only DIN, UNI, BS and UL flame retardant criteria, but now also the Italian and French regulations. Gabriel-Chemie masterbatches are already used in famous sports stadia around the world.

Gabriel-Chemie MAXITHEN® see pinfa Newsletter n°27 and n°41

More: http://www.gabriel-chemie.com/media/docs/news/en/PR_stadionsitze_Italy_en.pdf and http://www.gabriel-chemie.com/media/docs/news/en/Stadionseats_PRESS-RELEASE_en_Homepage.pdf

PIN flame retardant labels meet aerospace safety

Polyonics has launched PIN (phosphorus, nitrogen, inorganic) flame retardant adhesive labels for marking wires in aviation, railway, transport and electrical/electronics applications. Wire marking in aircraft necessitates robust materials and reliable adhesion, which will not fall off or unwrap when subject to fluids and chemicals (such as hydraulic fluid, jet fuel and lubricating oil), vibrations and temperature changes. The Polyonics polyamide film labels with acrylic adhesive meet Boeing FAR 25.853 and 25.855 requirements for fire safety (flammability), BSS7238 for smoke and BSS7239 for toxicity. The XF-641 (white) and XF-647 (yellow) labels have also passed Boeing 1347J specification for fluids resistance. Applications include aviation wire marking and cable identification, battery labels, electronic parts and devices, wire bundles

See also pinfa Newsletter n° 40 Polyonics PIN polyester labels for electronics and Newsletter n° 18 Polyonics bonding tapes for aviation.

Source http://tlmi.com/062214polyonics/ and http://www.polyonics.com/PerformanceLabels/wire-wrapping-labels.html

New forms of aluminium phosphate PIN FRs

Aluminium phosphate ammonium taranakite was synthesised in suspension, then heated to 150°C or 300°C to produce a hexagonal crystal form (t-hAP) with uniform small dimensions (1-2 µm). The fire safety performance of this hexagonal form t-hAP was tested in bismaleimide resin using a cone calorimeter, looking at time to ignition (TTI), peak and total heat release (PHR, THR). Loading of 0 – 20% t-hAP were compared to the same loadings of traditional spherical-form aluminium phosphate. The fire performance is shown to be related to release of water and ammonia which dilute fire gases, but also to formation of a protective char layer. The t-hAP form shows higher water release, lower flammable gas release from the polymer at higher temperatures (decomposition at specific temperatures), so reducing fire temperatures (heat release) and smoke emission, as well as a more protective char structure (fewer holes, uniform honeycomb char structure). The authors conclude that the t-hAP offers high fire performance, and also note better dispersion within the polymer matrix.

"Flame retardance and origin of bismaleimide resin composites with green and efficient aluminum phosphates", Q. You et al., J Applied Polymer Science 2014. http://onlinelibrary.wiley.com/doi/10.1002/app.41089/abstract

Aluminium PIN FRs for EVA copolymer

Five commercially available and new forms of aluminium hydroxide and boehmite (an inorganic PIN FR) were tested as flame retardants in ethylene-co-vinyl acetate (EVA), a copolymer widely used in a range of applications from construction and electrical engineering to biomedical. The objective was to test different product characteristics including particle size, density, specific surface area and pore characteristics. 25% PIN flame retardant loading in the EVA was used. Fire performance was assessed using cone calorimeter and pyrolysis combustion flow calorimeter (PCFC). Results showed that adaptation of the PIN FR characteristics significantly improved fire safety, in particular Peak Heat Release (pHRR). This is the result of improving the barrier effect of mineral char formed on the polymer surface and the resistance of this barrier to polymer melt during the fire, probably by rapid migration of the PIN FR during the fire-melt process, combined with orientation and agglomeration of the PIN FR in barrier formation. The study demonstrates the continuing potential for innovation for new applications and performance for mineral PIN FRs.

"Flame retardancy of ethylene vinyl acetate (EVA) using new aluminum-based fillers", R. El Hage, Polymer Degradation and Stability 108 (2014) 56-67 http://www.sciencedirect.com/science/article/pii/S0141391014002353

Agenda

3-8 Aug	San Francisco, USA	35th International Symposium on Combustion https://www.combustioninstitute.org/pages/page284.php
31 Aug – 5 Sept	Madrid, Spain	Dioxin 2014 (34th International Symposium on Halogenated Persistent Organic Pollutants) http://www.dioxin2014.org
16-18 Sept	Warsaw, Poland	Symposium M "Functional textiles – from research and development to innovations and industrial uptake" (E-MRS 2014, 2BFUNTEX, COST MP1105 & 1206) http://www.emrs-strasbourg.com
23-25 Sept	Atlanta, USA	Polymer Compounding for Innovation in the Plastics Industry www.compoundingconference.com
1-2 Oct	Berlin, Germany	FIVE: 3rd International Conference on Fires in Vehicles Call for papers open to 1 Dec 2013 www.firesinvehicles.com
7-9 Oct	Birmingham, UK	7th European Meeting on Chemical Industry & Environment (EMChE-7) http://venuebirmingham.com/emchie2014
7 Oct	Dubrovnik, Croatia	COST MP1105 Flaretex "Characterisation of flame retardant textile and related materials" (parallel to ITC&DC http://itcdc.ttf.unizg.hr) contact: Els.VanDerBurght@UGent.be
16-17 Oct	Gent, Belgium	2nd International FR Conference on Fire-safe Textiles and Plastics http://www.centexbel.be/agenda/fr-conference-fire-safe-textiles-and-plastics
17 – 20 Nov	Vienna, Austria	Going Green – Care Innovation 2014 – Electronics and the Environment http://www.care-electronics.net/CI2014/
9-11 Dec	Cologne, Germany	Fire Resistance in Plastics 2014 (AMI) http://www.amiplastics-na.com/events/Event.aspx?code=C606&sec=4182
2-4 Feb 2015	San Francisco, USA	Fire and Materials 2015 http://www.intersciencecomms.co.uk/html/conferences/fm/fm15/fm15cfp.htm
22-25 June 2015	Berlin, Germany	FRPM 15th European Meeting on Fire Retardancy and Protection of Materials http://www.frpm2015.bam.de/en/home/index.htm

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