pinfa
Phosphorus, Inorganic & Nitrogen Flame Retardants Association

Your newsletter for non-halogen fire safety solutions
No. 102 June 2019

Consensus and cooperation are gathering force, between a range of key stakeholders, to push together for fire safety to be effectively integrated into the EU's next Research, Technology and Development (RTD) funding programme: Horizon Europe (2021-2028, probably around 100 billion € EU funding). Moving forward from the stakeholder meeting successfully organised by IAFSS in December 2018 (pinfa Newsletter n°97), a joint letter has now been sent to the European Commission at the initiative of pinfa, signed by leading stakeholders (including firefighters' organisations, industry, fire prevention associations and civil safety organisations, research institutes…). If your organisation wishes to join this initiative, please see the article below. pinfa considers it important that key fire safety stakeholders act jointly to underline the importance of fire safety, as a key to enable innovation, sustainability and inclusiveness in tomorrow's society, to counteract continuing pressures to weaken fire safety requirements. These are illustrated by some of the stakeholders' responses to the UK consultation on "toxic chemicals" or the latest UL study on furniture in the USA (see articles below).

EVENTS

pinfa E-Mobility Workshop, Tokyo, 1st July 2019

The pinfa workshop on "Fire Safety Challenges in Automotive Plastics", Tokyo, 1st July, will take place within EMCE2019 (E-Mobility and the Circular Economy, 1-3 July 2019). The workshop will address fire safety challenges facing the automobile industry with electric and hybrid vehicles, such as compliance with standards and requirements of materials, choice of flame retardants and compliance with fire safety regulations. The workshop will enable discussion of how non-halogenated flame retardant solutions (PIN Phosphorus, Inorganic and Nitrogen can support the Japanese emobility market. Presentations will include pinfa members Adeka, Clariant and Dupont, alongside automotive manufacturers and materials experts.

pinfa eMobility workshop, Tokyo 1st July 2019, 14h-19h, within EMCE2019 simultaneous translation English/Japanese, https://www.icm.ch/emce-2019 Registration info@icm.ch

Design for Fire Safety in Greener Electronics

pinfa-NA (pinfa North America) held its sixth industry workshop in San Jose California, April 30 – May 1, 2019, on fire safety for green electronics. SAMPE (Society for Advancement of Materials and Process Engineering) and SPE (Non Halogenated FR Special Interest Group) were co-sponsors of the event. In addition to two lively panel discussions, the fifty attendees gained timely insight from twelve experts representing organizations including Hewlett-Packard, IBM, Corning, Underwriter Laboratories,

Texas Instruments, State of California Toxic Substances Control, MaterialWise, Sabic IP and others.

A primer on FRs and FR materials was provided by consultant Dr. Kelvin Shen and Dr. Alex Morgan of University of Dayton Research Institute. Keynote speakers included Dr. Karen Matthews of Corning and Matthew Boday of IBM. Dr. Matthews discussed Industry 4.0 or the 4th industrial revolution and how smart factories will dramatically change manufacturing practices. With connected smart "things" going forward, there will be a prevalence of inter-networking of devices, equipment, processes and factories. It was stated that IoT ("Internet of Things") will present an overall $1.5T market opportunity in 2025 while the second largest sub-segment "connected industry" will represent a $310B market by 2023. On the topic of IoT E&E devices, there will be over 20 billion active connected devices globally by 2025.

Doug Sober (Essex Technology), Roger Tietze (PART Consulting), Ralph Buoniconti (Sabic) and Tom Fabian (UL) shared the history and challenges of the adoption of non-halogenated flame retardants in CCL (copper clad laminate printed circuit boards) and components in the electronics industry. Over the last decade, there has been enormous progress in the development and application of flame retardants based on phosphorus, nitrogen or inorganic materials. In several cases, these materials bring technical advantages such as higher dimensional stability of printed circuit boards, higher glass transition temperatures or higher resistance to arcing in addition to sustainability benefits.

Jason Ord of Hewlett-Packard discussed the need of the IT industry for safer chemicals information. He stated one important step forward is introducing hazard assessment methodology into eco-label standards (e.g. TCO, EPEAT). It was also stated that use of the chemical hazard assessment tool GreenScreen yields good information. The PC industry strongly recommends that flame retardant manufacturers procure and make public GreenScreen assessments available at www.greenscreenchemicals.org and other public registries. He also lauded pinfa member companies for taking progressive steps in that direction.

Workshop website https://www.pinfa.eu/mediaroom/fire-safety-in-greener-electronics/

Short video: www.beard.de/2019-05_pinfa_SanJose/pinfa_GreenElectronics_SanJose_2019-05_low-res.mov

Photo: Adi Narayanan of Google fields a question during a panel discussion concerning fire safety in green electronics at the San Jose, California, workshop 1st May 2019

FIRE SAFETY COMMUNITY JOINT INITIATIVE


Joint stakeholder letter to the European Commission

To: Carlos Moedas, European Commissioner for Research and Innovation

23rd May 2019

The need for EU fire safety research in Horizon Europe

Fire safety was largely absent from the themes of Horizon 2020[1] and this risks recurring in Horizon Europe, despite increasing awareness[2] of the importance of fire safety in today's urban and technological society and of wildfire risk.

A meeting organised by IAFSS (International Association for Fire Safety Science), in Brussels on 3rd December[3], brought together key stakeholders from across Europe and DG Research, DG GROW and JRC.

This meeting concluded[4] that **fire safety is essential to enable a desired future.** Fire safety science is a prerequisite for innovation, sustainability and an inclusive society. Fire safety is key to resilience in contexts of technological developments, sustainable construction, an ageing population and climate change.

European fire safety research is needed to ensure cooperation between national levels, to develop consistent data, to enable critical mass for large scale-testing (important for firefighters facing new risks from today's fires) and to support EU policies. This requires a holistic approach, across different research themes and Commission services.

We, the undersigned stakeholders, ask that fire safety be recognised as a horizontal objective, integrated into the different thematic contents and specific tools of Horizon Europe.

Contact for coordination of this joint letter:
Jonathan Crozier, pinfa (Cefic) jcr@cefic.org

Signatory organisations – see following pages

Fire safety organisations co-sign letter to Europe

At the initiative of pinfa, leading fire safety organisations have signed a joint letter to the European Commission asking that fire safety be better integrated into the EU's R&D funding programme, Horizon Europe. Signatories include fire fighters organisations, a range of industry federations concerned by fire safety, fire safety associations, wildfire organisations and research centres. The initiative follows a first meeting organised by IAFSS (International Association for Fire Safety Science), with pinfa support, in December 2018 (see pinfa Newsletter n°97). The fire safety organisations' joint letter is parallel to the letter open to signature by individuals

launched by the Pau Costa Foundation in 2017 (see pinfa Newsletter n°93). The organisations' joint letter underlines that "fire safety is essential to enable a desired future. Fire safety science is a prerequisite for innovation, sustainability and an inclusive society. Fire safety is key to resilience in contexts of technological developments, sustainable construction, an ageing population and climate change". This joint letter is open to signature by further organisations or fire research centres, before it will be re-sent to the new European Parliament and the new European Commission when they are in place.

To sign the Pau Costa Foundation open letter: http://www.paucostafoundation.org/ing/open-letter.php

Fire safety organisations' joint letter to the European Commission, 23rd May 2019
https://www.pinfa.eu/mediaroom/fire-safety-organisations-co-sign-letter-to-europe/

If your organisation wishes to join the signatories of this letter, please contact pinfa cr@cefic.org

CALLS AND CONSULTATIONS

Public consultation on microplastics

ECHA (European Chemical Agency) has launched a public consultation on "a restriction on intentionally added microplastics". The consultation particularly targets industry, open to 20th September 2019 (but contributions on certain topics should preferably be submitted at intermediate dates before this deadline). A key aspect of the consultation is a proposed definition of microplastics: "intentionally added" to a substance or mixture at > 0.01% w/w and present as a solid, non-biodegradable, "polymer-containing" particles, to which additives or other substances may have been added; 1% or more of particles have size 1nm – 5mm (or length 3nm – 15mm for fibres). The consultation specifically addresses the definition and testing of biodegradability of such polymers, the definition of "intentionally added" and presence of microplastics as "impurities", uses of microplastics in different sectors (from agriculture to 3D-printing) and identification of other uses.

ECHA consultation on microplastics, open to 20th September 2019
https://ec.europa.eu/growth/content/echa-public-consultation-restriction-dossier-microplastics-intentionally-added-products_en

Looking for partners for nano-cellulose

Finnish research institute VTT is looking for partner(s) to commercialise a nanocellulose product as a flame retardant coating for timber materials. The new High-Consistency Enzymatic Fibrillation of Cellulose (HefCel) technology generates, from wood pulps, a nanocelulose gel with a very high solids content. This adheres well to timber surfaces, by spray or brush application, and is claimed to inhibit burning and to enable incorporation of colour pigments. The material was developed in a project funded TEXES (now Business Finland).

"Highly fire retardant coating from biomaterials developed by VTT", 24th April 2019,
https://www.vttresearch.com/media/news/highly-fire-retardant-coating-from-biomaterials-developed-by-vtt

SCIENCE AND COMMUNICATIONS

www.parliament.uk

Environmental Audit Committee

Toxic Chemicals in Everyday Life inquiry

Responses to UK Parliament Inquiry on chemicals

The UK Parliament is currently running an Inquiry into "Toxic chemicals in everyday life". Forty different inputs have been published (submission deadline was 8th March 2019).. Around a third of these refer to flame retardants, which could be expected in that one of the 11 questions (on chemicals policy and on chemicals in consumer products) specifically concerned the UK Furniture Fire Safety Regulations. Respondents include: fire fighters, fire scientists, environmental NGOs, cancer and health associations, and different industry sectors.

pinfa and Flame Retardants Europe (FRE, previously EFRA) submitted a joint response. This underlined the importance of fire safety with the increasing use of flammable materials in modern society and in sustainable buildings, the fact that not all FRs are the same and that FRs are from a wide range of different chemicals, the development of FRs with lower toxicity or lower emissions potential (polymeric, reactive …) and the effectiveness of the UK Furniture Fire Safety Regulations in saving lives and reducing fire impacts.

The furniture industry shows different positions. EFIC (European Furniture Industries Confederation) is very critical of the UK Furniture Fire Safety regulations. EFIC does however recognise that "There are many different flame retardants, with varying degree of potential for harm" but then contradictorily suggests that all flame retardants in UK furniture are "potentially toxic". EFIC suggests that problems are that furniture manufacturers cannot obtain information about which FRs are included in furniture materials, and that manufacturers may tend to not use FRs with a "lower level of risk" because they prefer a cheaper chemical. The British Furniture Federation recognises that the UK Furniture Fire Safety regulations "do save lives", but "should be updated to reflect modern manufacturing techniques and current fire risks".

Fire fighters (UK National Fire Chiefs Council, London Fire Brigade) acknowledge the need for certain chemicals, and press for use of less harmful alternatives. They state that "many halogenated or organic flame retardants that are currently in use" can damage health and the environment, but also "recognise the benefits of the use of flame retardants", and call for research and support for safer alternatives. They note that "the increased use of synthetic materials … increases fire loading" citing materials such as PU foams, furniture, fridges and noting "a need for many of these materials to be treated with flame retardants as a way of reducing the risk of fire" and of "making plastics safer". The fire fighters note the "*push to replace the hazardous halogenated flame retardants that are still on the market, with non-halogenated, non-organic flame retardants such as those that are mineral, phosphorus or nitrogen based and that as yet, have no known hazards*", citing Aluminium Hydroxide, Melamine, Ammonium Polyphosphate and EDA-DOPO. They not that outright bans of FRs in furniture, such as being considered in some US states "could have a serious impact on fire safety standards". The firefighters support the inclusion of a label on furniture to specify that flame retardants are used "to allow consumers to make a decision … based on safety" and also to facilitate end-of-life management.

Health associations (Breast Cancer UK, Cancer Prevention and Education Society) take negative positions on flame retardants, proposing "phasing out of organic flame retardants across consumer and industrial products" and suggesting that "flame

retardants increase fire toxicity, the principal cause of deaths in fires" (referring to McKenna et al. UCLAN 2018, discussed in pinfa Newsletter n°97).

The water industry (Anglian Water) notes that flame retardants include carcinogenic chemicals, which "could be a risk to drinking water", and that parameters are likely to be included in revision of the EU Drinking Water Directive.

Fire scientists underline the need to not reduce fire safety. They criticise the use of some brominated chemicals, e.g. UCLAN notes that "perhaps 10 – 20 BFRs have been shown to be persistent, bioaccumulative and toxic" but that industry seems to be permanently ready to substitute one brominated FR by another, when one is banned (a process which takes significant time and extensive studies).

Published stakeholder inputs to UK Parliament enquiry on "toxic chemicals in everyday life"
https://www.parliament.uk/business/committees/committees-a-z/commons-select/environmental-audit-committee/inquiries/parliament-2017/toxic-chemicals-in-everyday-life-17-19/publications/

UK Parliament inquiry on "Toxic chemicals in everyday life"
https://www.parliament.uk/business/committees/committees-a-z/commons-select/environmental-audit-committee/inquiries/parliament-2017/toxic-chemicals-in-everyday-life-17-19/

pinfa – FRE joint response to UK inquiry:
http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environmental-audit-committee/toxic-chemicals/written/97676.pdf

Figure 23: Still frames of the ISO 9705 Test Room burns for no flame retardant (NFR), organophosphate flame retardant (OPFR), reactive flame retardant (RFR), and no flame retardant with barrier textile (BNFR) chairs at 1, 7, 11, 14 minutes from ignition.

The charring on the surface of the barrier (BNFR) chair continued for the duration of the burn test; two still shots of BNFR chair past the 14 minute mark is shown in Figure 24. testing period.

Figure 24: Still frames of the ISO 9705 Test Room burns for no flame retardant with barrier textile (BNFR) chair at 30 and 50 minutes from ignition.

UL study shows low FR emissions from furniture

A three year study by UL assesses flame retardant exposure and fire performance of upholstered furniture with and without California TB117 (open flame test) requirement. 20 commercial design chairs were tested, 5 each of 4 types: no FR, OPFR in foam (organophosphorus TPhP + TBPP), reactive FR (not specified, reacts with the polyurethane foam during polymerisation), no foam FR but fibreglass textile barrier behind covering textile. Air emissions (VOC, aldehyde) and FRs in air, dust and dermal transfer processes were tested in the different chairs, both new and after artificial ageing, and in a TV set and a laptop computer for comparison Fire performance (TB117, smoulder resistance, full-scale open flame) and smoke emission were tested for the chairs. Conclusions are that in all cases air emissions were low with the furniture, and lower than for the electronics. FR release from the reactive FR foam was not detectable, but FRs were detected in dust and air from the OPFR chair and from the electronics products (halogenated and phosphorus FRs). The possible significance of the levels of these FR releases is not considered. None of the chairs passed TB117 but the chair using a barrier showed nearly fifty times lower peak heat release than the other chairs. Also for this chair, hydrogen cyanide was not detectable during in burn emissions, and carbon monoxide and smoke density were lower. The study concludes that TB117, which is designed to control smouldering, does not indicate reduced open flame hazards, and that the barrier technology (which is already used in furniture on the market) is effective to reduce fire hazards and chemical exposure.

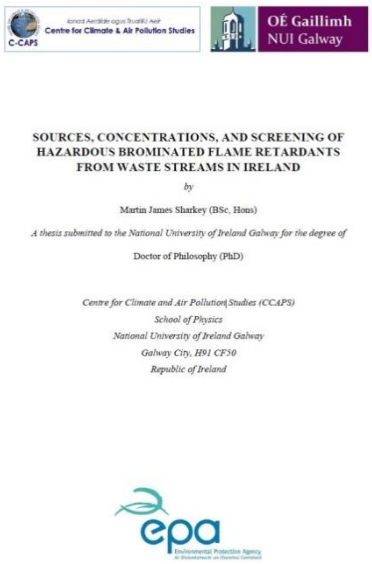
TPhP = triphenyl phosphate. TBPP = tertbutyl phenyl phosphate.

"New Study from UL Chemical Safety and Emory University Demonstrates Ways for Reducing Flame Retardant Exposure and Flammability Hazards of Residential Furniture" 23 April 2019
https://www.prnewswire.com/news-releases/new-study-from-ul-chemical-safety-and-emory-university-demonstrates-ways-for-reducing-flame-retardant-exposure-and-flammability-hazards-of-residential-furniture-300833002.html and full study report https://ulchemicalsafety.org//wp-content/uploads/2019/04/Human-Health-in-the-Built-Environment_FINAL.pdf

Polymer or plastic?

pinfa has perhaps not always been attentive in the past in our use of the words “plastic” or “polymer”. This is a general tendency, with for example leading conferences titled Fire Resistance in PLASTICS (AMI FRiP Conference, 3-5 December 2019, Cologne) or Fire Retardant POLYMERIC Materials (FRPM 25-29 June 2019, Turku, Finland). However, the vocabulary is important, as illustrated by the ECHA proposal (currently open to public consultation, see below) to define a “microPLASTIC as a “SYNTHETIC POLYMER containing particle”. In the future, pinfa will therefore try to use the term “POLYMER” to refer to synthetic (polymeric) chemical molecules, and the term “PLASTIC” to refer to materials (generally) consisting of one (or more) synthetic organic polymers combined with additives, such as flame retardants, stabilizers, fillers, etc. In this context, SYNTHETIC can refer to both chemically-synthesised polymers or processed natural polymers (e.g. poly lactic acid PLA). As thus defined, “PLASTIC” covers all of thermoplastics, thermosets and reaction-setting materials (e.g. epoxy resins). It can be noted that some flame retardants are organic polymers, used either as ‘additives’ in plastics, or as the principal polymer molecule in plastics. Also, some polymeric materials in which flame retardants are used are not plastics (e.g. wood, which contains the natural polymer cellulose, or wool or cotton …). And also, there are INORGANIC POLYMERS, such as the flame retardant ammonium polyphosphate. pinfa's intention is not to develop our own precise definition, but to be more precise in the future in our use of the words PLASTIC and POLYMER in order to reduce confusion.

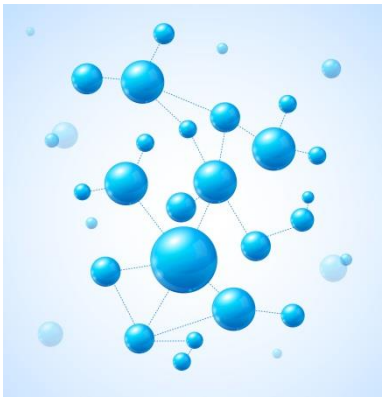
Separating waste containing brominated FRs



A thesis sponsored by the Ireland EPA looks at the question of brominated flame retardants in consumer waste, contamination of landfill leachate and techniques for sorting wastes containing brominated FRs. The thesis estimates that brominated FRs result in around 4 000 tonnes plastics and textile waste per year in Ireland being “hazardous”. Sampling of leachate from 40 municipal landfills showed levels of over 350 ng/l PBDEs, and the authors suggest “considerable contamination” of the environment. Portable XRF (X-Ray Fluorescence) measurement of elemental bromine was tested in over 550 samples of WEEE plastics, concluding that bromine levels above 710 mg/kg in plastic or textile waste can be used to designate as “hazardous” (presence of POP brominated FRs) with 94% segregation accuracy, increasing to 97% by adding elemental antimony testing.

“Sources, concentrations, and screening of hazardous brominated flame retardants from waste streams in Ireland”, M. Sharkey, NUI (National University of Ireland) PhD 2019 with C-CAPS and Ireland EPA http://hdl.handle.net/10379/15123

“Portable x-ray fluorescence for the detection of POP-BFRs in waste plastics”, M. Sharkey et al., Science of the Total Environment 639, 49-57 (October 2018) https://doi.org/10.1016/j.scitotenv.2018.05.132



Review of research into PIN FRs for thermoplastics

A review of over 120 science publications summarises current research into PIN flame retardant solutions for thermoplastics. It is noted that PIN FR solutions can avoid the problems of toxic and corrosive gases and black smoke generated by halogenated FRs. Developments in main PIN FR technologies are discussed, including for inorganic FRs (ATH, MDH), e.g. inorganic coating carbon microspheres, zirconium phosphate (ZrP) and organo-modified ZrP, aluminium hypophosphite, aluminium diethylphosphinates, ammonium polyphosphate (APP), e.g. hydroxyl functionalised or microencapsulated, melamine and derivatives (MCA) such as melamine polyphosphate, DOPO and derivatives, other phosphorus derivatives, bio-derived PIN FRs and synergistic combinations of different PIN FRs, e.g. with silicates and clays. The review shows the high level of current research into PIN FR solutions and the potential for innovation, particularly in developing solutions with lower FR loadings to minimise impact on polymer performance and to reduce costs, and the importance of improving the flame retardant – polymer interface.

"Review Paper. Halogen-free flame retardants for application in thermoplastics based on condensation polymers", N. Levința et al., Springer Nature Applied Sciences, 2019, 1:422
https://doi.org/10.1007/s42452-019-0431-6

NFPA report on smoke alarms in US home fires

The US National Fire Protection Association (NFPA) report on smoke alarms assesses their penetration in US homes, effectiveness in reducing fire impacts and challenges to be addressed. Adjusted data from surveys suggests that at least one smoke alarm is present today in around 92% of US homes. Smoke alarms are clearly effective: for an average c. 355 000 home structure fires per year in the US, smoke alarms were present in nearly three-quarters of cases, but nearly three fifths of fire deaths occurred where there was no alarm (40%) or where the alarm(s) were not operational (17%). Failure to maintain batteries is identified as a significant problem: where present, hard-wired alarms (mains power source plus back-up battery) sounded in 94% of fires large enough to trigger them, whereas battery-only alarms did so in only 81% of cases. This is despite the NFPA 101 Life Safety Code requiring hard-wiring of alarms for many years. From 2020, UL certification of smoke alarms will require to demonstrate resistance to activation by cooking but activation within 3 minutes by burning polyurethane foam. More than one fifth of survey respondents indicated that the smoke alarm had at some time sounded in a situation susceptible to develop into a fire, showing that the alarms play a significant role in preventing fires.

"Smoke Alarms in U.S. Home Fires", M. Ahrens, NFPA, January 2019
https://www.nfpa.org/News-and-Research/Data-research-and-tools/Detection-and-Signaling/Smoke-Alarms-in-US-Home-Fires

CHEMISTRY

Toward fire safety without chemical risk

Use of halogenated flame retardants continues despite health and environmental concerns

By Jacob de Boer[1] and Heather M. Stapleton[2]

Halogenated flame retardants are used widely in consumer products such as carpets, textiles, and electronics to reduce the risk of fire. It has been known for more than 20 years that these compounds can leach into the environment, with particularly high concentrations recorded in fish and marine mammals. Concerns have also been raised about carcinogenic and endocrine-disrupting effects in humans. Some brominated flame retardants—in particular, polybrominated diphenyl ether (PBDE) commercial mixtures and hexabromocyclododecane (HBCD)—

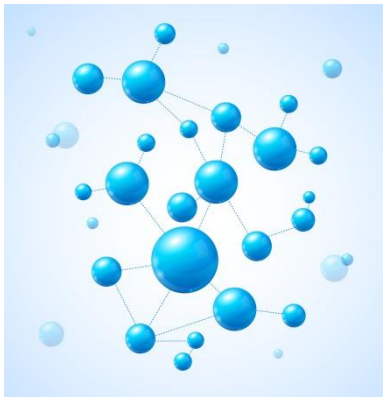
and replaced by another ha retardant, for which less exposure pathways and po mental and health effects 5). All substitutes showed although these effects w slightly different from tha pounds they had replaced.

In the meantime, a suite ated flame retardants was i 75 different brominated flar on the market, and many of detected in the environme of these compounds, scant available on their environm the time of introduction, be search are needed to collect

Campaigning scientists reposition on FR bans

Heather Stapleton and Jacob de Boer, two well-known environmental scientists with a long track record of research into flame retardants, have published an opinion article in 'Science' outlining their position on different types of flame retardants in different applications and on fire safety. Their key concern is that the "use of halogenated flame retardants continues despite health and environment concerns", noting that global production of halogenated FRs was stable 2010 – 2016. They note that the US Consumer Product Safety Commission (CPSC) is currently considering a restriction on additive, non-polymeric, halogenated FRs in children's products, furniture and electronics enclosures, which would be the first such CSPC ban on a class of products and would take account of development of new polymeric brominated FRs with lower exposure risks in use. The scientists note that alternative FRs with better environmental profiles are available (citing ENFIRO, see pinfa Newsletter n°36). They state that "no one wants to compromise fire safety" and that "flame retardants are needed in airplanes, cars, insulation and electronics" but question whether FRs are necessary or effective in some applications, in particular furniture and children's products. They conclude that "it is crucial that the use of flame retardants is critically evaluated to determine where they are needed and where they are not".

"Toward fire safety without chemical risk. Use of halogenated flame retardants continues despite health and environmental concerns", J. de Boer & H. Stapleton, Science, vol. 364, issue 6437, p 231-232 https://doi.org/10.1126/science.aax3089



Single molecule kaolin – melamine – phosphorus FR

Researchers produced and tested in polypropylene a new PIN flame retardant, combining in one molecule phosphorus, nitrogen (in melamine) and mineral kaolin. Designated MPPK (melamine salt of pentaerythritol phosphate with kaolin) the substance was synthesised in three steps: pentaerythritol (a simple molecule with 5 carbons and four OH groups) was reacted with phosphoric acid, then with kaolin, then with melamine dispersed in methanol. The MPPK was tested at 15 – 25% loading in polypropylene, and compared to neat polymer, 25% kaolin and 25% melamine phosphate. MPPK showed to improve thermal stability of polypropylene at high temperatures, enabled to achieve UL94-V0 (2mm) at 20% loading (similar to melamine phosphate) and reduced peak heat release rate and total heat release rate by c. 80% (compared to neat polymer). MPPK resulted in cellular and coherent char production and resulted in the inner half of the sample not burning in cone calorimeter test. The authors conclude that this molecule is an effective flame retardant for polypropylene, more so than melamine phosphate.

"Manufacturing, thermal stability, and flammability properties of polypropylene containing new single molecule intumescent flame retardant", A. Abdelkhalik, G. Makhlouf, M. Hassan, Polym Adv Technol. 2019;30:1403–1414 https://doi.org/10.1002/pat.4573

PRODUCT INNOVATION AND APPLICATIONS

First ever food safe FR pallets are PIN

For the first time, flame retardant pallets have been certified to pass all requirements for FDA-regulated materials (US Food and Drug Administration food safety guidelines). Rehrig Pacific's FM Approved pallets are stated to be food safe (safe for direct food contact), fire retardant and durable, offering tough and resilient strength in use (proven durability, see pinfa Newsletter n°100). The company has developed a proprietary non-halogenated flame retardant composition, using only GRAS (Generally Recognized as Safe) components. Rehrig Pacific states that this success is achieved by avoiding bromine, which can leach into foods (even through packaging such as cardboard) and glass fibres.

"Rehrig Pacific Introduces Food-Safe, Fire-Retardant Pallet" 13 May 2019
http://www.prnewswire.com/news-releases/rehrig-pacific-introduces-food-safe-fire-retardant-pallet-300848771.html

New reactive phosphorus FR from Evonik

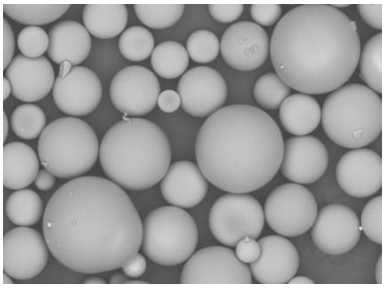
Evonik is now supplying a phosphate methacrylate as a reactive flame retardant and anti-corrosion agent. Together with other monomers the HEMA-P (2-hydroxyethyl methacrylate phosphate) monomer forms a polymer by radical polymerization, thus it is not subject to migration. As well as improving fire performance, the phosphate methacrylate acts as an adhesion promotor, anti-corrosion agent, improves emulsion stabilisation and reduces static charging. Containing 30% methyl methacrylate, it offers a low viscosity for easy processing and a very low colour index, suitable for optical applications. Other uses include plastics, polymer resins, adhesives, paints and coatings, fibres, composite resins and gel coats.

"Evonik to supply phosphate methacrylate as a reactive flame retardant and anti-corrosion agent", 19 November 2018 https://corporate.evonik.de/en/Pages/article.aspx?articleId=102825

FRX and Yoo-Point launch water-based emulsions

pinfa member FRX Polymers with China's Yoo-Point have jointly developed water-based emulsions of polymeric phosphonate PIN flame retardants. This is considered an environmentally-preferable alternative to solvent-based systems. Applications already implemented in the market include polyurethane (PU) coatings and low-density PU foams. The < 400 nm particle size in the emulsion ensures stability, flame retardancy performance and low total volatile organic compounds emissions (TVOC). It enables to achieve global car manufacturers strict specifications for automotive interiors for TVOC and fogging, and also the new Chinese mandatory standard GB/T 27630-201X. Other possible applications include PU foams and coatings for clothing, rainwear and synthetic leather, as well as use in other compatible resins.

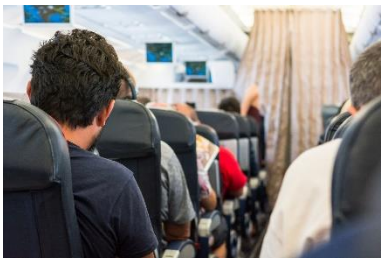
"FRX Polymers® and China's Yoo-Point Jointly Develop Water-Based Emulsions Containing Nofia® Non-Halogenated Flame Retardants", 29th April 2019
https://www.frxpolymers.com/news-events-2/2019/4/30/frx-polymers-and-chinas-yoo-point-jointly-develop-water-based-emulsions-containing-nofia-non-halogenated-flame-retardants



Innovation in silica & inorganic FRs

AnHui Estone Materials Technology has launched new grades of silica and inorganic flame retardants. A hollow silica, with low specific gravity and high sphericity, can reduce the dielectric constant in copper clad laminates (CCL). A chemically porous silica, with low specific gravity, high specific surface area and narrow particle size distribution, can at low loadings improve film properties. The nano-powder inorganic FR can reduce total heat release and smoke density in cables (e.g. achieving China GB31247 B1 in EVA).

"AnHui Estone Materials Technology to launch FR grades & silica at Chinaplas 2019" *https://polymer-additives.specialchem.com/news/product-news/anhui-estone-materials-technology-fr-grades-silica-chinaplas-000218386*



Fire resistant films in aircraft

A report by Stratview expects high growth in demand for fire resistant films for aviation, with the market exceeding US$ 330 million by 2024. Growth will be driven by increasing production of aircraft, and demanding fire safety requirements. This is pushed by regulators, since the US FAA (Federal Aviation Authority) research programme in the 1990's concluded that 40% of fatalities in survivable aviation crashes were caused by fire and smoke. Fire resistant films are used to prevent fire spread, in particular in the thermal and acoustic insulation in fuselage. The main materials used in these films are PVF (poly vinyl fluoride), PEEK (polyetheretherketone) and polyimide. PEEK, which is inherently fire resistant, is expected to show the highest growth, because of good performance characteristics.

Stratview "Aircraft Flame-Retardant Films Market is Likely to grow at an impressive rate over the next five years" 11/4/2019 *https://www.openpr.com/news/1698867/Aircraft-Flame-Retardant-Films-Market-is-Likely-to-grow-at-an-impressive-rate-over-the-next-five-years.html*

Growing demand for flame retardants

Several market studies predict continuing growth for flame retardants, in particular for non-halogenated PIN solutions.

360MarketUpdates projects an annual growth rate of 5.1% (CAGR) for the world flame retardant market 2018-2013. Key drivers for this growth in demand are identified as fire safety needs in infrastructure construction, especially in India, China and ASEAN countries, as well as growing use of flame retardants in electronic and electrical goods.

FMI (Future Market Insights) estimates that the world non-halogenated flame retardant market will grow at 6.4% CAGR 2015-2025, to exceed US$ 4.5 billion. Drivers identified in the report are increasing use of polymers in electrical and electronics, construction and transport, especially automotive, as well as "rising concerns" about halogenated FRs. Non-halogenated FRs are considered by the report to be "more environmentally friendly …can be recycled and produce relatively low and non-toxic smoke …".

ReportOcean, however, estimates that the world non-halogenated flame retardant market will grow at >8% in value CAGR 2017-2024 (>7% growth in tonnage), to reach over 6.9 billion US$ (around 3 million tonnes). Main drivers are here indicated as adoption of environmentally friendly solutions by industry and regulations, both excluding halogenated FRs, as well as growth in construction and electronics user industries.

Energias assess expected growth in fire-resistant cables, estimated CAGR of more than 3% 2018-2024, to reach over 2.1 billion US$. These cables ensure circuit integrity for specified times in case of fire. Increasingly stringent fire safety regulations, urbanisation, growth in the construction and automotive industries, and increased spending on fire precautions in buildings are here identified as drivers.

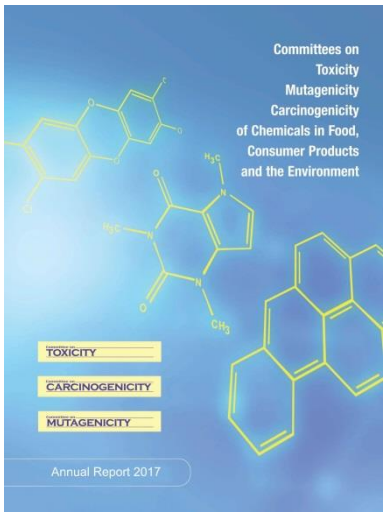
OceanReports 16/4/2019 "Halogen Free Flame Retardant Market – Global Industry Analysis, Size, Share, Growth, Trends, and Forecast, 2016 – 2024"
https://amarketresearchgazette.com/halogen-free-flame-retardant-market-global-industry-analysis-size-share-growth-trends-and-forecast-2016-2024/

360MarketUpdates 2/4/2019 "Global Flame Retardant Chemicals Market, Trends, CAGR Status, Market Growth, Analysis and Forecast (2018 – 2023)"
http://thenewsmates.com/2019/04/02/50652/global-flame-retardant-chemicals-market-trends-cagr-status-market-growth-analysis-and-forecast-2018-2023/

FMI 10/4/2019 "Non-halogenated Flame Retardants Market Revenue Expected to Exceed US$ 4.5 Bn by 2025" http://www.dailychronicle24.com/2019/04/10/non-halogenated-flame-retardants-market-revenue-expected-to-exceed-us-4-5-bn-by-2025/

Energias Market Research, 13/3/2019 "Fire-Resistant Cable Market: to witness a CAGR of 3.1% during 2018-2024"
https://www.apnews.com/Globe%20Newswire/cd6cd5999ae87a9313f80a3730024c92

OTHER NEWS



UK Committee opinion on PBDEs in children's food

The UK Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) has now published its (delayed) 2017 annual report, including an Addendum addressing the question of PBDEs (polybrominated diphenyl esters one family of brominated flame retardants and their derivatives) in the diet of infants and young children (up to age 5). This extends a 2015 COT statement on PBDEs in diets of infants aged up to 12 months. The 2017 report states that most uses of PBDEs have been phased out by international bans and regulations, however "some PBDE congeners are especially persistent in the environment". It concludes that exposure from PBDEs in commercial infant foods and formulas is unlikely to be a health concern, but indicates a potential concern for exposure to some PBDE congeners in breast milk, dust and soil and recommends further research to verify that levels in breast milk and food are declining as expected.

UK Committees on Toxicity, Mutagenicity, Carcinogenicity of Chemicals in Food, Consumer Products Committee joint annual reports
https://www.gov.uk/government/publications/committee-on-toxicity-of-chemicals-in-food-consumer-products-and-the-environment-annual-report

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