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EVENTS

AMI | Events

Fire Resistance in Plastics

Fire Resistance in Plastics (Europe)

The leading European conference on flame retardants comes back to Cologne for 2023, covering flame retardant materials, applications and testing. The conference is the most important meeting place for polymer suppliers and compounders, downstream users, flame retardant producers, researchers and associations, with over 150 participants already registered.

17th AMI Fire Resistance in Plastics, 28-30 November 2023, Cologne, Germany www.ami.ltd/event-fire

AMI | Events

Fire Retardants in Plastics

Fire Retardants in Plastics (USA)

The US flame retardants conference takes place in Philadelphia, 26th-27th April 2023. The conference covers trends, regulations, new applications, developments in formulation and technology in the fire retardant industry

17th AMI Fire Retardants in Plastics, 26-27 April 2023, Philadelphia, USA
<https://www.ami-events.com/event/60ee9240-2cf9-4088-a455-e35e259e5b97>

PINFA NEW MEMBER



IMERYS mineral-based specialities

A world leader in mineral solutions for industry and consumer applications, IMERYS offers performance PIN FR synergists. IMERYS provides functional additives for the mineral formulations of customers' products, mineral components as formulation constituents, and process enablers used in customers' manufacturing processes but not present in the end products. IMERYS aims to deliver technical and industrial quality and innovation, with ambitious social responsibility goals.

In the area of fire safety, IMERYS provides mineral flame retardant synergists for engineered thermoplastics and elastomers. IMERYS' synergists can help address fast evolving regulatory requirements and demanding use and technical performance specifications, with reduced CO₂ footprint.

IMERYS is thrilled to join pinfa. We look forward to networking with the FR ecosystem and co-creating new solutions with players in the value chain. pinfa membership will facilitate staying at the forefront of the fast evolving regulation landscape and provide visibility in Europe and worldwide to voice out our umbrella of FR solutions based on industrial minerals.

Imerys solutions:

www.imerys.com

<https://www.imerys-performance-minerals.com/>

<https://www.imerys.com/product-ranges/imershield>

FIRE SAFETY



Last decade shows little fire safety progress

1.35 million fires in the US in 2021 caused 3 800 civilian fire deaths, 14 700 injuries and 16 bn. US\$ property damage. This covers only fires to which fire services responded. The US NFPA (National Association for Fire Protection) "Fire Loss" 2021 report notes that this is one fire every 23 seconds, and a fire death every three hours. The total number of fires was 55% lower than in 1980 and inflation adjusted property damage was 20% lower, despite increases in population. However, the death rate per reported home fire was higher in 2021 than in 1980. NFPA underline that most of the reduction in the number of fires and in fire losses occurred more than a decade ago and that there is still much to do to reduce fire impacts, especially for home fires.

"Fire Loss in the United States During 2021", S. Hall & B. Evarts, US NFPA, September 2022, 12 pages <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/US-Fire-Problem/osFireLoss.pdf>



E-scooter fire kills eight

Fire in e-scooter spreading to others in a showroom causes fire and smoke killing 8 guests in hotel. CCTV video shows an explosion in an e-scooter in a showroom in Secunderabad, Hyderabad, India, on the evening of 12th September. The showroom was closed. The fire is [said](#) to have rapidly spread to other e-scooters (photos show 10 – 15 burnt e-scooters), [releasing](#) “fire, smoke, chemicals and toxic gases”. Smoke and flame spread into the five storey Ruby Luxury Pride Lodge hotel, in the building above the showroom (25 guests present at the time), killing 8 people (killed by smoke) and a further 9 hospitalised. The owners of the hotel and of the e-scooter showroom have been arrested, accused of operating the e-scooter showroom without permits. India intends to replace 80% of motorised scooter sales by e-scooters by 2030 and already launched an investigation into safety in March this year following a number of e-scooter fires, [suggesting](#) that faulty battery cells are the main cause of fires.

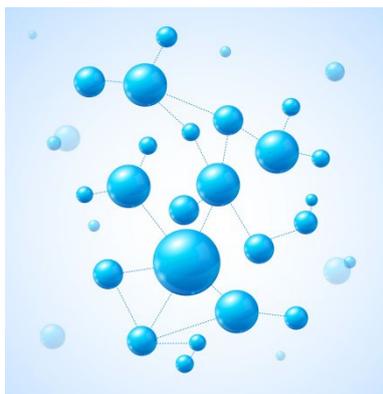


Standards and e-bike fire safety

NFPA identifies e-bike battery fires problem and points to need for the industry to adopt safety standards, such as UL 2849. An article in NFPA Journal summarises information on e-bike fires to date and actions possible to address this. New York fire services identified 130 e-bike caused fires in the first half of the year, up 50% from 2021, with already five related fire deaths. A proposal to ban e-bikes and e-scooters from all public housing met with vocal opposition, as the machines are increasingly seen as a key means of transport. Most fires are caused by battery failures. Safety standards such as UL standards 2272 (electrical systems in personal mobility devices, 2016) and 2849 (e-bikes, 2020) address battery resistance to impacts, overheating, charging control. But statistics are not yet available to prove the impacts on fire occurrence. Quality of chargers is also important. Another problem results from overload of electrical circuits or extension leads during charging, with a particular risk for “juicers” (individuals who recharge rental e-bikes overnight for payment, often with many devices). As of April 2022, the New York City fire code bans storage or charging of more than five e-mobility devices in one area, unless fire safety equipment is installed (sprinklers, fire doors ...).

NFPA Journal (US National Fire Safety Protection Association), 4 August 2022 <https://www.nfpa.org/News-and-Research/Publications-and-media/NFPA-Journal/2022/Fall-2022/Features/E-bikes> and video <https://www.youtube.com/watch?v=oYiof2Kinvc&t=6s>

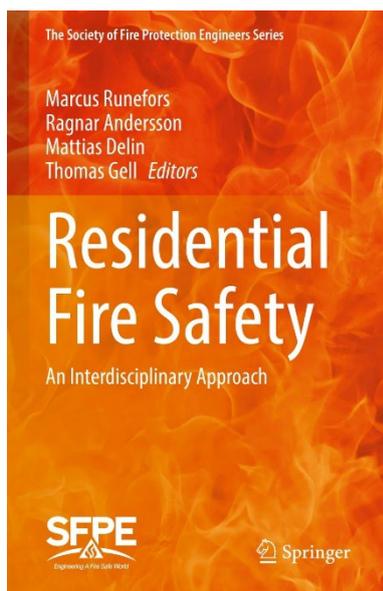
Photo: “Fire investigators issue urgent warning over fires involving e-bike batteries”, London Fire Brigade 1 July 2021 <https://www.london-fire.gov.uk/news/2021-news/july/fire-investigators-issue-urgent-warning-over-fires-involving-e-bike-batteries/>



Fire safety and green buildings

Analysis of published research into fire safety and sustainable construction shows interest in insulation materials and timber, as well as smoke, fire emissions and indoor air quality. 2013 published articles were identified and analysed, showing that three of the four most cited articles (640, 280, 115 citations) concern insulating materials, and one smoke toxicity (128). The country producing the highest number of articles is the USA, targeting energy efficiency, fire resistance and chemical properties of insulation materials. As well as insulation materials, structural building materials including timber and wood, and smoke are the two other areas of high research interest.

“Bibliometric Analysis of Fire Safety Research in Green Buildings 2000-2021”, M. Yildiz, F. Beyhan, Online Journal of Art and Design, volume 10, issue 4, October 2022, ISSN: 2301-2501
<http://adjournal.net/articles/104/10410.pdf>



New book: Residential Fire Safety

Fires kill 120 000 people annually worldwide. In this new 400 page book, experts analyse causes, demographics, prevention. Fire death rates are especially high in the very young (1-4 years) and the old (>70) and decrease with national income. Fatalities have decreased by 46% since 1990 but with important variations between countries. This is only a small part of the picture, as around 95% of residential fires are unreported and not attended by fire services. Concerning fire prevention, chapters address smoke alarms and human response to them, fire performance and impacts of different types of doors, fire safety of furnishings, interior textiles and bedding, sprinklers. Fire prevention and intervention strategies are presented. Flame retardants are briefly discussed (p. 168), noting the range of different types of FR available, and the need for products that are environment and health friendly. It is emphasised that FRs may address only one aspect of fire safety (e.g. one type of ignition source) but not other fire behaviour aspects (other types of ignition source such as smouldering, or fire growth). The book concludes that a holistic approach to fire safety is needed, covering residents (capacities, behaviour), technology (including flame retardants), actors and governance, including increased knowledge.

Note: chapter 1 indicates 120 000 fire deaths/year worldwide (p. 3). 300 000 / year is indicated (p. 61)

“Residential Fire Safety. An Interdisciplinary Approach”, Ed. M. Runefors , R. Andersson, M. Delin, T. Gell, SFPE (Society of Fire Protection Engineers) – Springer, ISSN 2731-3638, 2022
<https://link.springer.com/book/10.1007/978-3-031-06325-1>



Bus fire kills 18

Fire reportedly caused by electrical fault in air conditioner kills 18 passengers in bus in Nooriabad, Pakistan, other passengers were seriously burnt. Police [stated](#) that the fire started in the air conditioner, possibly because of a short circuit. The bus was taking flood victims back to their village from Karachi. The Police has [suggested](#) that the vehicle was unfit for use, but also that its emergency door worked correctly and that it was travelling within legal speed limits. Inadequacy of fire safety standards for buses and coaches is an ongoing problem, see e.g. pinfa Newsletters n°85 (France ministerial recommendations 2017) and 106 (US National Transport Safety Board recommendations 2019).

RECYCLING

35 * LCA, Environment, Pollution	84 * Polymer Chemistry, Organic and Inorganic Chemistry
4 Cellulose	28 Chemical engineering
4 Ethylene	20 Extraction (chemistry)
76 Fire retardant	18 Flammability
7 Melamine	7 Nanocomposite

PIN FRs in plastics recycling

Study by PNO for pinfa analyses development opportunities and data needs for PIN flame retardants in plastics recycling. Nearly 100 publications and patents were analysed, and six research and industry experts interviewed. There is today very little published information on the impacts and fate of FRs in different plastics recycling processes (mechanical, chemical-solvent, chemical-pyrolysis). R&D has concentrated on separation of waste electronics plastics containing brominated FRs, because this is a legal obligation in Europe. The study expects both use of PIN FRs and end-of-life plastics recycling to increase. The main challenges for mechanical recycling are identified to be upstream collection and sorting, and degradation of the polymer itself under reprocessing. Chemical recycling technologies are emerging and will become significant. The study recommends to cooperate with the value chain to develop data and studies on PIN FRs in end-of-life plastics, fate of PIN FRs in different recycling processes, sorting of plastics containing different PIN FRs (including for specific streams such as end-of-life batteries), separation and recycling of PIN FRs in chemical recycling processes.

“A study of the state-of-the-art and Impact of Phosphorus, Inorganic and Nitrogen Flame Retardants (PIN FRs) on recycling, taking into account the current and upcoming, legislation, policies, technologies and market developments”, PNO for pinfa, 2022. For more information please contact pinfa. Figure: extract from research literature search heatmap.

Compounding WORLD

The global magazine for polymer compounders.

Specialist additives for plastics recycling

Compounding World says developments in additives will open new opportunities to enable and improve polymer recycling. Additives discussed include antioxidants and stabilisers, important to limit polymer degradation during reprocessing, in particular because contaminants present in post-consumer plastics (e.g. inks, fillers, catalyst residues), can accelerate oxidative damage. Compatibilisers and coupling agents, both usually reactive, can improve interaction between different polymers and fillers present in recovered materials and can repolymerise or copolymerise during reprocessing. Other additives can improve viscosity and reprocessing. Flame retardants are not identified as a particular challenge in polymer recycling.

“Recycling. Additives rise to the challenge”, Compounding World, October 2022 www.compoundingworld.com

FLAME RETARDANT MARKET RESEARCH REPORTS



“Natural and non-toxic flame retardants”

A commercial “market research report” invents a misleading new jargon for FRs which can only generate confusion. What seems to be the same study, titled “Natural and Non-toxic Flame Retardant Market” is on sale online, for several thousand Euros, from several companies ([QY](#), [Preditctive](#), [ReportMines](#), [24ChemicalResearch](#) ...). The definition of “Natural and non-toxic” is unclear, for example “does not contain any toxic chemicals ... made from natural ingredients such as minerals, salts, and plant extracts”. Major players cited are Burnblock, Double Bond Chemical, Beijing SOL, Inerco, Turning Star. pinfa has obtained part of one of these reports and we see that only one pinfa member is cited amongst the 17 “top” global companies, and that the company identified as having the highest market share in the report is a compounder not a flame retardant producer. The report received by pinfa contained a “typo” nearly doubling the estimated global market value of “Natural and Non-Toxic” FRs for 2028. After correction, the report’s numbers suggest that “Natural and Non-Toxic” FRs represent 60% to 130% of the total global market for all FRs, as estimated by other market studies, see below.

pinfa regrets that these so-called market study companies have invented a new jargon “Natural and Non-toxic Flame Retardant”, which seems to be undefined and meaningless, whereas the term PIN is now well-understood, and has the precise and recognised meaning of non-halogenated phosphorus, inorganic and/or nitrogen based, flame retardants.



Flame retardant “market reports”

Market studies for sale online expect sustained growth in flame retardants worldwide but the numbers given vary hugely.

Most reports point to construction, automotive and electronics as key growth sectors, driven by growth in plastics and polymer use, in particular epoxies. Many point to increasing fire safety regulations and demand for “eco-friendly” FRs as halogenated FRs are limited by environmental and health concerns.

Billion US\$	Growth CAGR	Current market	To reach
Global market all FRs			
MarketResearchGuru	4.3%		5.3 bn US\$ (2028)
FutureMarketInsights	5.9%		11.2 bn US\$ (2027)
AlliedMarketResearch	6.6%	7.4 bn US\$ (2020)	14 bn US\$ (2030)
MarketsandMarkets	5.1%	7.2 bn US\$ (2022)	9.2 bn US\$ (2027)
P&SIntelligence	5%	7.6 bn US\$ (2021)	12 bn US\$ (2030)
ResearchandMarkets	5.9%	8.2 bn US\$ (2021)	13.6 bn US\$ (2030)
Global market non-halogenated FRs			
CoherentMarketInsights	6.4%		5 bn US\$ (2027)
IndustryArc	8%		7.2 bn US\$ (2027)
VerifiedMarketResearch	8.6%	4.1 bn US\$ (2020)	7.9 bn US\$ (2028)
Global intumescent coatings market			
GMI GlobalMarketInsights	6.5%	1 bn US\$ (2021)	1.6 bn US\$ (2028)

RESEARCH AND INNOVATION



High tracking resistance PIN FR PBT

Lanxess (pinfa member) launches high performance PBT for electric vehicles, electronics, with non-halogenated UL 94 V-0.

The new polybutylene terephthalate (PBT) compounds combining glass fibre reinforcement, IEC 60664-1 electrical insulation with CTI A (Comparative Tracking Index) rating 600 V, fire performance and hydrolysis resistance. The non-halogenated flame retardant compound, with 25% short glass fibres, achieves UL 94 V-0 down to 0.75 mm and SAE/USCAR-2 Re. 7 Class 3 hydrolysis resistance. The compound also offers mechanical performance, dimensional stability, flowability for processing and can be coloured EV orange. Demanding electrical insulation and tracking resistance are needed for electromobility applications with high voltages, including fast charging, as well as for electronics miniaturisation.

“Pocan E: new PBT product range from LANXESS with outstanding tracking resistance”, Lanxess press release, 20th September 2022
<https://lanxess.com/en/Media/Press-Releases/2022/09/Pocan-E-new-PBT-product-range-from-LANXESS-with-outstanding-tracking-resistance>



PIN FR adhesive silicone rubber sheets

General Silicones launches halogen-free flame retardant silicone rubber sheets for adhesion to various materials. A thin surface layer enables use by application with PUR or hot-melt adhesives. The silicone rubber achieves UL 94 V-0 fire performance, no melt, no drip, with low fire emissions of carbon monoxide, of VOC and of toxic gases and low smoke density. In fire, the material becomes hardened and ceramic. It is available with embossing and custom colours and offers anti-slip, durable resistance to high temperatures, chemicals and water, as well as electrical insulation. The silicone rubber sheets can be integrated into roll-to-roll textile processing or applied to items such as construction panels, clothing, shoes, machinery parts, electronics, railway or aerospace.

Photo: Compo-SiL®

"Halogen Free Flame Retardant Sheets and Surface Materials Innovation Through Compo-SiL®", 27th September 2022 <https://bit.ly/3yy3och>



Polymeric P FR selected for airport seating

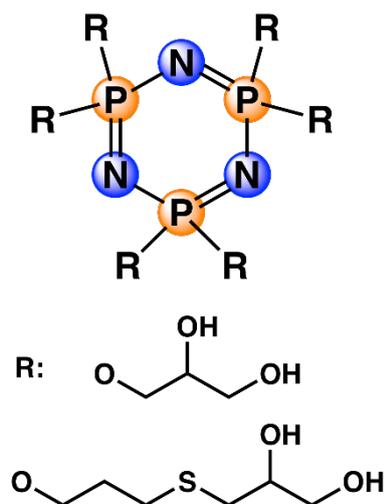
FRX polyphosphonate PIN flame retardant has been selected to ensure fire safety of airport polyester seat fabrics. The polyphosphonate is combined with polyester to produce a fabric blend achieving airport fire safety requirements. FRX and Sichuan EM Technology are combining the polyphosphonate PIN FR with polyester to produce a wash-durable fibre with 2.2% phosphorus content (22,000 ppm) which offers quality touch and feel, breathability and abrasion resistance. The fibre meets UK furniture fire standard BS 5852 part 1, without dripping, and also offers high ignition resistance. It can be blended with wool, cotton or other textile fibres. The polyphosphonate PIN FR is also compatible with post-consumer recycled polyester. FRX notes that this application of the PIN FR enables textile user industries to ensure fire safety and move away from halogenated flame retardants, whilst continuing to use recognised, long wearing polyester fabrics in existing production processes.

"FRX Innovations' Nofia® Selected by Major European Airport to Provide Fire Protection in Furniture", 27 September 2022

<https://newsdirect.com/news/frx-innovations-nofia-r-selected-by-major-european-airport-to-provide-fire-protection-in-furniture-187369930>

"FRX Innovations and Sichuan EM Technology Co., Ltd Jointly Develop Flame Retardant Upholstery Fabrics for The UK Furniture Market with Outstanding Touch and Feel", 3 October 2022

<https://newsdirect.com/news/frx-innovations-and-sichuan-em-technology-co-ltd-jointly-develop-flame-retardant-upholstery-fabrics-for-the-uk-furniture-market-with-outstanding-touch-and-feel-519932052>



Durable PIN FR for nylon/cotton fabrics

Water-soluble cyclophosphazenes provide effective, wash-resistant fire resistance to 50:50 “nyco” blend fabric. The novel phosphorus-nitrogen PIN compound, hexa (allylamine) cyclotriphosphazene (CPZ), see Mayer-Gall et al. in pinfa Newsletter n°106, was reacted with derivatives of glycerol or thioglycerol to introduce water-soluble moieties. Loading of 30% was applied to the textile in aqueous solution at pH4, using a melamine derivate as cross-linker, followed by curing at 120 °C. The treated textile showed LOI (Limiting Oxygen Index) increased from 20% (pure nyco) to 23% (glycerol derived) or 27.5% (thioglycerol derived) and passed the ISO 15025 flammability test, self-extinguishing performance even after 10 wash cycles at 80 °C. Analysis suggested that sulphur (thioglycerol derived) was acting in the gas phase and phosphorus was mainly active in the condensed phase, resulting in increased char formation.

“Water-Soluble Cyclophosphazenes as Durable Flame-Retardant Finishes for Nylon/Cotton Blend Fabrics”, O. Zilke et al., ACS Appl. Polym. Mater. 2022, <https://doi.org/10.1021/acsapm.2c01257>



Polymer smoke toxicities

Seven construction polymers were tested for fire performance and smoke, showing considerably different toxic emissions. Cone calorimeter, thermogravimetric analysis and FTIR (Fourier Transform Infrared Spectroscopy) were used to analyse fire performance (flashover risk, heat release) and smoke toxicity (FED Fractional Effective Dose). The polymers tested were High Density Expanded Polystyrene HDEPS, Low Density Expanded Polystyrene LDEPS, Ethylene Vinyl Acetate EVA, Low-Density Polyurethane LDPU, High-Density Polyurethane HDPU, Polyethylene PE, Extruded Polystyrene XPS. Of these, HDPU showed the highest risk of flashover, EVA the highest total heat release and LDPU the highest smoke toxicity, whereas EVA showed the lowest smoke toxicity. These seven widely-used building material polymers showed significant differences in fire performance and smoke toxicity (seven to twelve fold differences between the best and worst polymers for each parameter). Polymer compounds with flame retardants were not studied.

“Thermal Hazard and Smoke Toxicity Assessment of Building Polymers Incorporating TGA and FTIR—Integrated Cone Calorimeter Arrangement”, P. Doley et al., Fire 2022, 5, 139. <https://doi.org/10.3390/fire5050139>



Fire and smoke toxicity for sandwich panels

Flame retarded phenolic foam core panel showed lowest toxic smoke emissions, did not reach danger limit for warehouse fire.

Recent major fires have occurred in warehouses and logistics centres in South Korea (e.g. Icheon 38 deaths, Yongin 5 deaths, both 2020) and property damage costs for warehouses with sandwich panels are increasing. Four sandwich material core materials were fire-tested in the cone calorimeter, with FT-IR analysis of fire gas emissions, then FED (fractional effective dose) for hazardous gases was calculated and escape time modelled for a warehouse using sandwich panel walls. The materials tested were expanded polystyrene (non-FR EPS), urethane foams (FR rigid PIR, non-FR spray) and FR phenolic foam. PIR shows the highest peak heat release rate of nearly 600 kW/m². Toxic fire gases (mainly CO) are higher from the urethane foams than from EPS. Modelled escape time from a warehouse is one to seven minutes for EPS and for the urethane foams, whereas the danger limit for gas toxicity was not reached for the FR phenolic foam by the end of the modelling (ten minutes).

“Fire retardant performance, toxicity and combustion characteristics, and numerical evaluation of core materials for sandwich panels”, S. Wi et al., Environmental Pollution 312 (2022), 120067
<https://doi.org/10.1016/j.envpol.2022.120067>



Causes of fires in photovoltaics

Fires in PV are estimated to occur at c. 3 fires per year per 100 MW capacity installed, with connectors a significant cause.

Other fire causes are the PV module itself, DC isolator switches and fuses, cables and inverters. Because PVs generate continuous current, high voltage arcs can occur and be sustained. These can be extremely hot and cause ignition of adjacent materials. Most fires are not caused by the equipment, for example inverters are generally equipped with sensors and safety features to avoid failures. Fires are however significantly caused by damage during and faulty installation, in particular loose or badly installed electrical connections, moisture ingress or by damage to cables for example by rodents. These problems are accentuated by weathering and absence of maintenance or inspections of rooftop installations. One third of fires were of unidentified cause, or cause outside the PV installation. The authors conclude it is important to mitigate consequences in case of ignition.

“Fault tree analysis of fires on rooftops with photovoltaic systems”, N. Nizam Ong et al., Journal of Building Engineering 46 (2022) 103752
<https://doi.org/10.1016/j.jobee.2021.103752>



APP oyster shell bio-based flame retardant

Oyster shell powder reacted with ammonium polyphosphate reduced heat and smoke release of epoxy resin 70 – 80 %. Oyster shell powder (300 mesh) was ball milled with NaClO (0.3% w/w to oyster shell) for several hours, then added to APP (ammonium polyphosphate 2500 mesh) and further milled. Ratio of prepared oyster shell powder to APP was 1:1 to 1:10. The resulting APP-oyster shell material was tested as a flame retardant in DGEBA epoxy at 1 – 10 % loadings. In the epoxy samples, APP alone gave very considerable reductions in heat, smoke and carbon monoxide release. Peak heat release rate was somewhat lower with around 1:4 oyster shell:APP, compared to APP only, and peak smoke release rate was lowest with 1:1 oyster shell:APP. The improved fire performance and fire gas toxicity mitigation with the oyster shell material is considered by the authors to be due to increased char production, with a compact and continuous char including calcium as well as nitrogen, oxygen and phosphorus elements.

“Effect of functionalized oyster shell powder with ammonium polyphosphate on fire safety performance of epoxy resin”, J. Ren et al., Progress in Organic Coatings 172 (2022) 107054
<https://doi.org/10.1016/j.porgcoat.2022.107054>



PIN FR plywood shows low smoke toxicity

Plywood with phosphorus-nitrogen flame retardants showed very low toxic fire gases and achieved IMO fire performance. The plywood was vacuum impregnated with water soluble PIN FR consisting mainly of ammonium polyphosphate (APP) (pinfa comment: probably short-chain to enable solubility), guanyl urea phosphate (GUP) and phosphonic acid. Toxic fire gases were tested according to IMO (International Marine Organization) Res. MSC. 307(88):2010/ANNEX 1/Part 2[8]. All toxic gases tested were non detectable for the PIN FR plywood, whereas they were significant for polyurethane and PVC, except carbon monoxide which was considerably lower for the PIN FR plywood and below IMO specifications. Smoke emission was also below IMO requirements. Fire performance (CF Critical Flux at Extinguishment, Total and Peak Heat Release THR and PHR) were also below IMO specifications.

“Evaluation of Toxic Gas Generation, Smoke Generation, and Flammability in Flame-Retardant Plywood Combustion Tests”, H-J. Park & S-U. Jo, Preprints 2022 <https://doi.org/10.20944/preprints202209.0003.v1>



PIN FRs for PET from recycled bottles

Less than 10% PIN FR loading, plus a chain extender, enabled production of quality PET foam from post-consumer bottles. Aluminium-tris-(diethylphosphinate) 8% with montmorillonite (MMT) nanoclay 1% were used as PIN flame retardant and a multi-functional epoxy-based styrene-acrylic oligomer as chain extender (1%). Both foam and injection moulded plates were produced from the recycled PET. PIN FR addition decreased foam cell size, probably due to decreased melt strength, deteriorating foam strength and elasticity. This was resolved when the chain extender was added. Both plates (2 mm) and foam samples achieved UL 94 V-0. Limiting Oxygen Index (LOI) was improved to c. 28 and 31 for FR recycled PET plates and foam, compared to c. 23 without FRs and peak heat release rate (PHRR) was around 50% lower. The authors conclude that these PIN FRs at <10% loading, used with a chain extender, enable recycling of post-consumer PET to quality, fire performance material.

“Flame retardancy of PET foams manufactured from bottle waste”, K. Bocz et al. Journal of Thermal Analysis and Calorimetry 2022
<https://doi.org/10.1007/s10973-022-11423-3>

OTHER NEWS



Phosphate esters well below health-based limit values in UK foods. Eight organophosphate esters (OPEs), used as plasticisers and/or flame retardants, were tested in 393 food product samples in the UK: TCEP, TCIPP, TDCIPP, TBOEP, TnBP, TPHP, EHDPP, TMPP. The highest detected total OPE was below 20 µg/kg wet weight in milk products but concentrations in animal-derived foods were not significantly different from those in plant-derived foods or in processed foods. Cereals and fruits were the main dietary contributor for adults. Dietary intakes were well below health-based limit values (RfDs) and were similar to data reported from other countries. If dietary intake was combined with estimated dust inhalation and dermal intakes for infants, high exposure scenarios were close to RfDs, suggesting a narrow margin of safets in some cases.

“Organophosphate Esters in UK Diet; Exposure and Risk Assessment”, M. Gbadosi et al. SSRN 2022 in press
<http://dx.doi.org/10.2139/ssrn.4141108>

PUBLISHER INFORMATION

This Newsletter is published for the interest of user industries, stakeholders and the public by pinfa (Phosphorus Inorganic and Nitrogen Flame Retardants Association), a sector group of Cefic (European Chemical Industry federation) www.pinfa.org. The content is accurate to the best of our knowledge, but is provided for information only and constitutes neither a technical recommendation nor an official position of pinfa, Cefic or pinfa member companies. For abbreviations see: www.pinfa.org