



Annual Report 2020

pinfa

Phosphorus, Inorganic & Nitrogen Flame Retardants Association

www.pinfa.eu



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FOREWORD

A year like no other sums up 2020. We all witnessed an unprecedented global health pandemic bring life as we know it to a grounding halt. In spite of the extraordinary difficulties, the world community showed unparalleled strength and resilience and mended the broken seams, as best as they could. As part of the chemical industry, a designated essential sector in the fight against COVID-19, we're proud of how pinfa member companies joined efforts in their local communities and regions, supplying disinfectants, masks and a helping hand when needed most.

In line with its mission, pinfa was steadfast in its commitment to maintain high fire safety standards across the world and standards which minimize the risk of fire to the general public by continuing to improve the environmental and health profile of flame retardant products. This mission was especially important to ensure the continuity of progress in fire safety awareness, safer design and fire resistance materials, in a year where government resources were stretched to the maximum.

Fire safety is a continuous societal need that cannot be put on hold, even in times of crisis as the consequences are also devastating. In line with our mission, we forged new partnerships with the fire safety community, launched new studies on smoke toxicity, organized webinars on the energy transition and the fire safety risks associated with batteries, participated in numerous public consultations to promote the importance of fire safety and flame retardants, and called for the integration of fire safety in European funded research. All of which are highlighted in this report.

2021 was welcomed with open arms by all and marks our global journey to recovery. The 2020 health crisis shed new light on the fragility of our society and has invigorated a new enthusiasm for the protection of human health and the environment. There is renewed optimism for a world where sustainability is at the forefront of business and policy making. In response, the European Commission launched an ambitious Green Deal and Sustainable Chemicals Strategy.

We at pinfa have an exciting programme lined up in 2021. We will be joining forces with our value chain partners, the fire safety community and the European Commission to ensure that safer, greener flame retardants stay a top priority for the Green Deal and Sustainable Chemicals Strategy.



Adrian Beard
pinfa Chairman

A handwritten signature in blue ink, appearing to read 'A Beard'.



Esther Agyeman-Budu
pinfa Sector Group Manager

A handwritten signature in blue ink, appearing to read 'Esther Agyeman-Budu'.

pinfa EU

About pinfa

pinfa is the Phosphorus, Inorganic and Nitrogen Flame Retardants Association and is a Sector Group within Cefic, the European Chemical Industry Council. pinfa represents the manufacturers and users of non-halogenated phosphorus, inorganic and nitrogen flame retardants (PIN FRs). The members of pinfa share the common vision of continuously improving the environmental and health profile of their flame-retardant products. This vision is coupled with a commitment to maintain high fire safety standards across the world, standards which minimize the risk of fire to the public. Therefore, pinfa members seek to dialogue with the users of PIN FRs in order to identify their fire safety and technology needs.

In close cooperation with its sister associations pinfa North America and pinfa China, pinfa co-operates with national and supranational organisations (EU, OECD, United Nations) as well as other industry associations, consumer organisations and non-governmental organisations to ensure the development of scientific knowledge related to the whole life cycle of PIN FRs.

The Executive Committee



ADRIAN BEARD
CHAIRMAN



MIKE KLIMES
VICE-CHAIRMAN



THOMAS FUTTERER
VICE-CHAIRMAN



ESTHER AGYEMAN-BUDU
SECTOR GROUP MANAGER

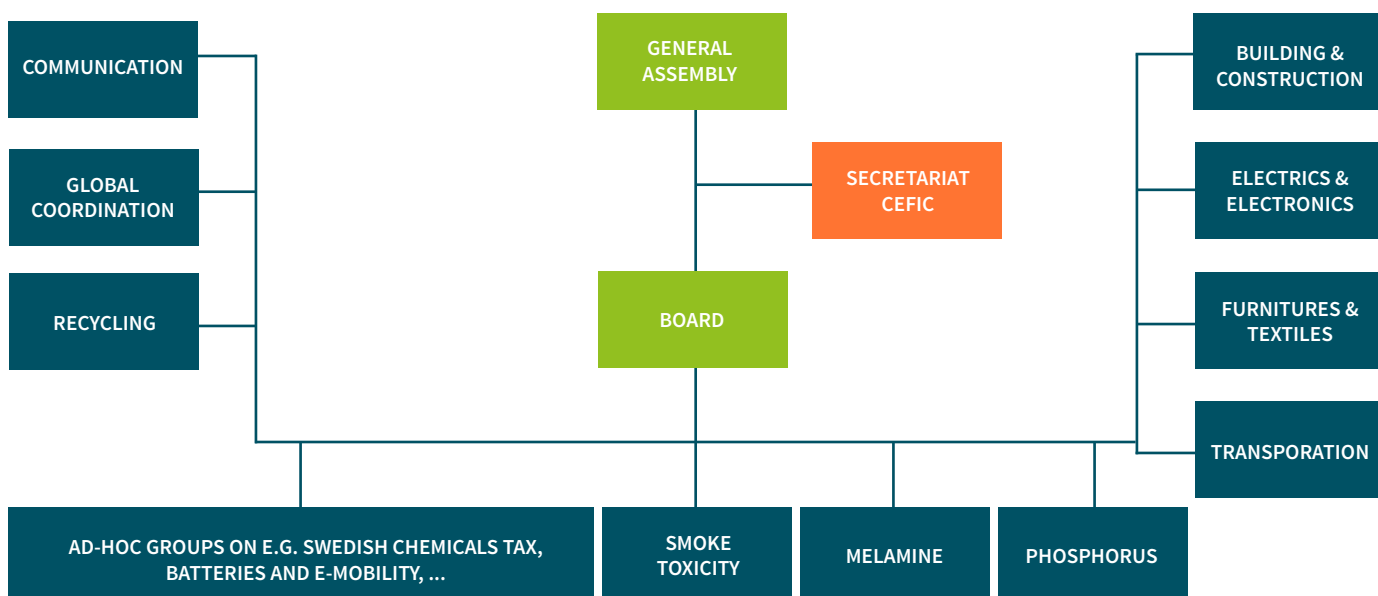


The members of pinfa at a general assembly meeting, photo ©A Beard.



Working Together

Working groups bring together pinfa member companies, with support from Cefic staff, consultants or other partners as appropriate.



The Board

BEARD Adrian
CLARIANT P&C (DEUTSCHLAND) GMBH

BOURGEOIS Yann
HUBER ENGINEERED MATERIALS

ESCHE Thomas
BASF SCHWEIZ AG

FUTTERER Thomas
CHEMISCHE FABRIK BUDENHEIM

GREEN Richard
ADEKA POLYMER ADDITIVES EUROPE SAS

JALBA Adriana
ICL EUROPE COOPERATIEF U.A

KLIMES Michael
NABALTEC AG

SAKAI Atsushi
ADEKA CORPORATION

SAUERWEIN Reiner
NABALTEC AG

TEBBE Heiko
LANXESS DEUTSCHLAND GMBH

VANSTEEGER Herman
HUBER ENGINEERED MATERIALS

WIETSCHORKE
Ulrich ADEKA CORPORATION

YONEZAWA Yutaka
ADEKA CORPORATION

ZUCHELLI Ugo
ITALMATCH CHEMICALS S.P.A.

The Advisory Board

In recent years, there has been increased public discussion about the safety and environmental impacts of flame retardants (FRs). Although largely focused on halogenated FRs, concerns have also been raised, to a lesser extent, about some non-halogenated FRs. Conversely, where FR use has decreased, concerns have been raised about fire safety. As a result, the appropriate use of FRs and whether alternatives to FRs provide sufficient fire safety protection have become an important issue that policy makers are trying to address.

Dialogue with the entire fire safety community, from industry to firefighters, will be key to finding solutions to this important societal concern. pinfa regards and promotes flame retardants as an essential part of fire safety technologies, which should become part of a holistic solution to fire safety in our communities. For this reason, pinfa set up already in 2018 an Advisory Board to ensure that it could create a platform to maintain a dialogue with the Fire Safety community.

pinfa's Advisory Board consists of representatives from the flame-retardant industry, downstream user industries, testing and research institutes, academic circles, environmental experts and firefighting departments. The meetings of the Advisory Board aim to bring a wide range of stakeholders together to discuss topics related to fire retardants and fire safety to achieve synergies and increase overall understanding of the challenges we face. We encourage varied viewpoints to be shared in order to learn from each other's experiences and perspectives. This group convenes on average twice a year. It is an open group, meaning pinfa extends invitations to new stakeholders depending on the topics discussed.

In our 2020 review of issues being addressed in the Advisory Board meetings, eleven core topics were identified, which could be grouped into four broad categories emerged: (1) Fire safety (2) Advocacy & public opinion, (3) Sustainability & public health, and (4) Emerging trends.

Testimonials



JACOB DE BOER
UNIVERSITY OF AMSTERDAM



I value my participation in the pinfa Advisory Board because I find the dialogue between environmental research/academia and industry very important. It is crucial to understand each other. It is also useful for me to hear about recent developments in flame retardant production and use, and international regulations. At the same time, I am able to inform the board about results of environmental studies and discuss the pros and cons and the environmental behaviour of certain substances.”



ELIE VAN STRIEN
CHAIR OF THE EUROPEAN FIRE SAFETY ALLIANCE



The pinfa Advisory board is a place where experts meet to exchange information and give input on fire safety issues. For me as Chair of the European Fire Safety Alliance it is an interesting platform to discuss with people who are committed to improve fire safety in Europe.”



MARGARET MCNAMEE
PROFESSOR OF FIRE SAFETY ENGINEERING, LUND UNIVERSITY



I appreciate the opportunity to participate in the discussions as part of the pinfa Advisory Board. These meetings give the opportunity for researchers like myself to discuss pressing topics (like fire and sustainability) with other researchers, industry representatives and practitioners. The tone is respectful and the discussion is open. I invariably have the opportunity to learn from others and provide some of my own knowledge to the group.”



The EU Chemical Strategy states that it aims to *“promote the EU’s resilience of supply and sustainability of chemicals used in essential applications for society through EU funding and investment mechanisms”*.

POLICY & ADVOCACY

The new EU policy landscape: opportunities for more sustainable flame retardants

GREEN DEAL AND CHEMICALS STRATEGY

The EU “Green Deal” (December 2019) is central to the mandate of the new European Commission (2019-2024), as negotiated with the Council (Member States) after the 2019 EU Parliament elections. It sets key objectives of cutting pollution, restoring biodiversity and boosting resource efficiency and the circular economy.

The “Chemicals Strategy for Sustainability ... to ensure a toxic-free environment” promised in the Green Deal, was published in October 2020 and foresees radical developments in chemicals regulation and policies in Europe (summary pinfa Newsletter n°119). REACH will be reinforced and extended. New policies are announced on “sustainable-by-design” chemicals (with environmental footprinting of chemicals), safe recycling, compliance enforcement of chemical regulation and for information on chemicals in products. The “Chemicals Strategy” is part of the wider Green Deal “Zero Pollution Action Plan” to be adopted in 2021, addressing legislation on air, water, soil and waste, and which will further impact chemicals.

These new policies will pose challenges to some flame retardants, with pressure on chemicals which show environmental toxicity, persistence, mobility, bioaccumulation or endocrine disruption. Conversely, pinfa sees important opportunities for PIN FRs and for the PIN FR business in Europe, as the Chemicals Strategy aims to *“promote the EU’s resilience of supply and sustainability of chemicals used in essential applications for society through EU funding and investment mechanisms”*.

Other Green Deal initiatives on products and articles will also strongly impact chemicals, in particular the “Sustainable Products Initiative” (expected to particularly target electronics and telecommunications, furniture and textiles) and the extension of EcoDesign. The EU EcoDesign Directive is mandatory for product categories for which criteria are defined, and can directly impact FRs: EcoDesign criteria for TVs and displays banned halogenated FRs in October 2019, although this is being legally challenged by the brominated FR industry.





OPPORTUNITIES FOR PIN FRs WITHIN THE NEW EU CHEMICALS STRATEGY

Flame retardants play an important role in the sectors cited for chemicals innovation and opportunities in the new EU Chemicals Strategy: construction materials, textiles, low-carbon mobility, batteries, wind turbines and renewable energy sources. The Strategy announces regulatory challenges to all chemicals, including assessment of combinations of chemicals, new criteria for environmental toxicity, persistence, mobility, bioaccumulation, endocrine disruptors and nanomaterials. However, pinfa sees important opportunities for PIN FRs in objectives such as:

- safe and sustainable-by-design chemicals
- REACH requirement for overall environmental footprint of chemicals
- emphasis on recycling and addressing “legacy substances” in waste streams
- identification of essential uses and applications of chemicals for society

pinfa welcomes the challenges of the new Chemicals Strategy. PIN FRs offer solutions for fire safety which can fulfil the Strategy’s objectives of safety, sustainability and recyclability. pinfa is ready to engage with the Chemical Strategy’s proposed actions on innovation, to ensure new assessments of chemical safety, and to continue to improve the environmental footprint of our products.”
MICHAEL KLIMES, *pinfa Vice-Chairman, Nabaltec.*

The new EU Chemicals Strategy proposes to define ‘essential uses’ of chemicals. pinfa sees this as a key opportunity for flame retardants. Fire safety is needed by society to save lives and protect property, and flame retardants are critical to enable safe development of priority sectors such as electric vehicles, renewable energy, green buildings and connected objects.” **THOMAS FUTTERER**, *pinfa Vice-Chairman, Budenheim.*

pinfa Input to Policy making



An important opportunity to engage with regulators and stakeholders to develop PIN fire safety will be the EU's new Research and Innovation funding programme, Horizon Europe 2021-2027 (€100 billion EU budget). Horizon Europe is also cited as a funding tool in the Chemicals Strategy. pinfa joined the European Batteries Partnership in 2020, and is looking to join other strategic partnerships to engage with Horizon Europe in industry sectors where fire safety is important.

A challenge for pinfa across the Green Deal and Chemicals Strategy will be to convince regulators that fire safety should be considered as an essential function for relevant consumer and industrial products. For example, at present, fire safety is not directly considered in the EU Horizon Europe programme (other than wildfires). Similarly, the proposed new EU Batteries Regulation does not include fire in proposed safety criteria. In 2021, pinfa will continue to communicate with other industries, researchers and stakeholders concerned by fire safety to push together to better integrate fire safety into EU policies.

In the context of increased pressure on chemicals in the Green Deal, rolled out through the new Chemicals Strategy, the Sustainable Products Initiative, the Zero Pollution Action Plan, we need to show that PIN flame retardants offer positive societal value, by contributing to fire safety, at the same time as preferable sustainability profiles.



pinfa prepared and submitted input, or exchanged with Cefic and other partners, for a number of public or stakeholder consultations on EU or national policies.

- Ireland: national Furniture Fire Safety Regulation
- EU (JRC): revision of Textile Industry BAT BREF (IED)
- EU: chemicals strategy
- EU: review of EcoDesign Directive
- EU EcoDesign criteria: smartphones & tablets
- EU: Green Public Procurement
- EU: revision of General Product Safety Directive
- EU Ecolabel: TVs and monitors
- EU: evaluation Construction Products Directive
- EU: Sustainable Product Initiative
- EU: product environmental claims & footprinting (PEF)

pinfa's input to such consultations aims to ensure that fire safety is taken into account in policies and product criteria, whereas this is often not the case. For example, the General Product Safety Directive currently does not include any minimum fire safety requirements. pinfa also aims to ensure that chemical requirements are realistic for PIN FRs.

Input to EU public consultations makes pinfa visible, and more generally makes fire safety visible, both to EU policy makers, and to the public (input to EU consultations is published on the EU website).



Swedish Tax on Chemicals in Electronics



“The Swedish Chemical tax is inefficient and misses its goals – for several years I have been advocating to fundamentally change it or abolish it altogether. It was counter-productive to the sustainability efforts we did at HP and other electronics OEMs.” HANS WENDSCHLAG, *Consultant for pinfa and former employee of Hewlett Packard.*



“I have been dealing with this taxation topic for almost a year and I really wish that the Swedish government would be open to the fundamental criticism from almost all stakeholders, including environmental groups.” FRIDA FAXBORN, *business policy expert at IT & Telekomföretagen, the Swedish IT Industry organization.*

In April 2017, the Swedish Tax on Chemicals in Certain Electronics (Lag 2016:1067) entered into force which put a tax on electronic articles and white goods. The tax rate depends on whether (and which) halogenated (brominated, chlorinated) or phosphorus based flame retardants are used. The aim of the tax is to promote substitution of “critical” flame retardants by posing an excise tax on them – in addition to the obvious target of raising money for the State. Since taxation is a national legal domain, the law does not need to be aligned within the European Union.

pinfa and many other stakeholders including Swedish ecolabel and environmental organisations have been criticizing the tax since its early origins, because they believe that it does not achieve its original intention of promoting the substitution of critical flame retardants (FRs), this led to a joint White Paper.

In November 2019, the Swedish Government asked the Swedish Chemicals Inspectorate (KEMI) and the Tax Agency (Skatteverket) to investigate if the chemical tax meets its intended primary goal, i.e. to stimulate producers of the taxable products to select safer alternatives. If the goal is not met, KEMI and the Tax Agency, by March 1st 2021 [deadline has been extended to 17 May 2021 meanwhile], shall present changes to the law to ensure it's more effective. On October 1st, the Swedish authorities delivered their report with the following summary:

- A. the tax does not meet its intended goal to stimulate the producers of the taxable products to use safer chemicals,
- B. the tax is not cost effective,
- C. the administrative burden is significant,
- D. it is difficult to judge which substances should be taxed,
- E. the appendix to the chemical tax legislation has many errors and gives unclear support.

During the December 8th stakeholder dialogue, where IT&Telekomföretagen and pinfa again participated, KEMI asked for input to the following areas of possible legislation improvements:

1. Measures to reduce the administrative burden for companies and authorities
2. Remove the differentiation between reactive and additive
3. Review the law definition of additive/reactive and review the appendix
4. Extend the tax to more types of goods

Sustainability Taskforce on Melamine

Melamine is an essential and fundamental building block used as an alternative to halogenated flame retardants in many applications such as protective textiles used in upholstery for commercial transport (e.g. buses, trains, airplanes) and spaces (e.g. public buildings and offices) as well as clothing, such as the uniforms worn by firefighters, as well as in wood, plastics, foams and other flammable materials. It is also used to manufacture thermal liners, heat resistant gloves and aprons, among others¹.

Since the deliberate and criminal addition of melamine to infant formula in China and pet food in the USA, melamine has been under global scrutiny². In response, pinfa set-up a new Product Sustainability Taskforce on Melamine to monitor developments and safeguard the interest of melamine-based flame retardants.

CLASSIFICATION

Harmonised classification (CLH)

In 2020, pinfa contributed to the public consultation launched by the European Chemicals Agency (ECHA) On 8 December 2020, ECHA's Risk Assessment Committee (RAC), composed of independent experts from EU Member States, adopted its recommendation for the classification of melamine during its 55th meeting as a (1) suspected carcinogen (category 2) and (2) Specific Target Organ Toxicity –1 Repeat Exposure (substance that may cause damage to the urinary tract through prolonged or repeated exposure³). The decision of the RAC will be communicated to the European Commission, the only body in the EU with the competency to classify melamine. This process is ongoing, please check the ECHA website⁴ for the latest information.

¹ Source: <https://www.pinfa.eu/flame-retardants/what-are-pin-frs/>

² FAO (United Nations Food and Agriculture Organisation) 26/9/2008 « Melamine milk crisis » <http://www.fao.org/newsroom/en/news/2008/1000926/index.html>

³ RAC Opinion: <https://echa.europa.eu/documents/10162/bfeec668-edf2-d959-3af9-861020103a4d>

⁴ Registry of CLH intentions until outcome: <https://echa.europa.eu/registry-of-clh-intentions-until-outcome/-/dislist/details/0b0236e181ed61e7>

Self-classification

On 29 May 2020, the Melamine REACH Consortium self-classified melamine as a suspected (cat.2) human reproductive toxicant substance. The self-classification of melamine requires all operators to label melamine packaging accordingly and without undue delay. Labelling information of a reprotoxic substance is established under the EU CLP Regulation (EC) No 1272/2008.

The pinfa Product Sustainability Taskforce on Melamine will continue to monitor developments in 2021.

CLASSIFICATION NOTE

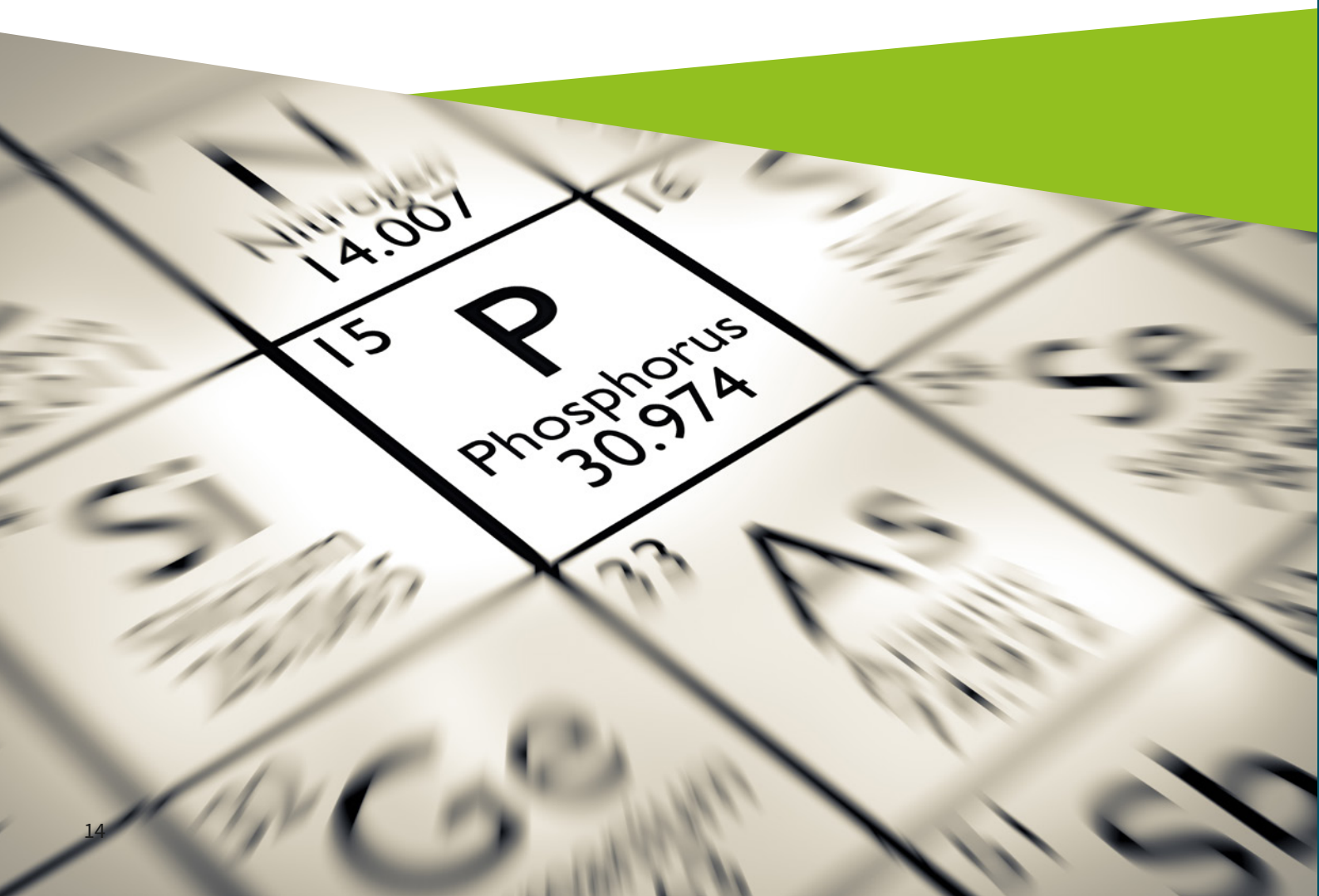
pinfa notes that the self-classification and pending CLH of melamine are probably not relevant for melamine as used as a flame retardant, that is after inclusion in a material, but are relevant to compounders and processors handling melamine. pinfa currently expects that the self-classification of melamine to not impact melamine derivatives used as flame retardants (unless they contain significant levels of unreacted melamine) and pinfa member companies are currently assessing this. Any classification updates will be indicated in the pinfa product selector.

Sustainability Taskforce Phosphorus based Flame Retardants

Phosphorus is an extremely versatile element and the diversity of its chemical compounds is reflected in a large span from benign and biogenic chemicals like the phosphates that are part of our DNA (this time not an awkward analogy, but the exact truth) to intentionally toxic pesticides and nerve gasses. Flame retardants are of course meant to be non-toxic and harmless in the environment, nevertheless some phosphorus flame retardant have hazardous properties as neat chemical substances. This should not translate into significant risk for commercial users or end consumers.

Phosphate esters are the largest group of phosphorus based flame retardants in commercial use and even they span a variety from alkyl- to arylphosphates, small to large molecules to oligomers, as well as chlorinated versus non-halogenated types.

pinfa set up the sustainability taskforce on phosphorus based flame retardants to respond to publications and enquiries from regulators, scientists and journalists. In 2020, the task group prepared a response to a review publication on organo-phosphate ester flame retardants identifying several shortcomings in the publication. pinfa wants to make more industry data available to scientists and support them in consulting the extensive database existing from the REACH registration process and available on the ECHA website. In addition, the group dealt with questions concerning phosphorus flame retardants in mobile phones, in relation to the upcoming ecodesign regulation on these devices in Europe.



pinfa ACTIVITIES AND PROJECTS

pinfa e-mobility webinars

The worldwide growth in electric vehicles opens opportunities for PIN FRs, as increased fire risk (batteries, high amperage drive chains, charging stations) meets increasing use of polymers and composites to reduce weight. Demanding mechanical, electrical and esthetic performance requirements are driving FR innovation and favoring PIN solutions, in particular avoidance of contact corrosion by halogens and high resistance to arcing.

pinfa organised successful electromobility workshops already, with a total of over 300 participants, in China 2018 and in Japan and Europe 2019 (see pinfa Newsletter n° 103), in cooperation with industry organisations and professional conferences. In 2020, pinfa continued this activity, with two webinars and a total of nearly 450 participants.

A pinfa webinar on 28th October 2020, discussed materials challenges for fire-safe performance plastics for e-mobility, continuing the dialogue with automobile manufacturers and suppliers. Speakers included pinfa member companies (RadiciGroup, Schneider Electric), downstream users (TE Connectivity) and Underwriters Laboratories (UL).

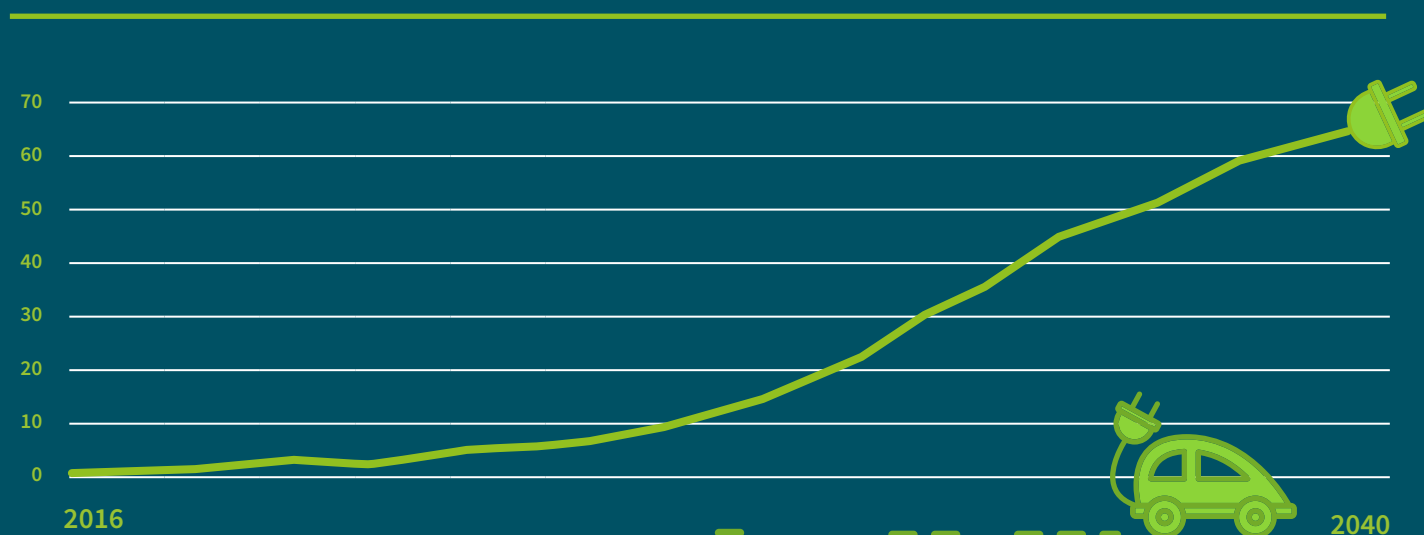
“Electric vehicles imply an increased need for fire safety, especially because of high voltages, both within the car and in charging mode. This leads to more demanding fire test requirements. At the same time, manufacturers are defining increasing performance and environmental specifications.”

FRANZ JANSON, TE Connectivity

“Electric vehicle charging poses specific fire and overheating risks, in particular for fast charging stations, because of high power supply use without surveillance, especially for installations in humid atmospheres or outdoors.”

NICOLAS DUPONT & LAURENT TRIBUT, Schneider Electric

Million electric cars per year - World



Graph based on estimates at <https://www.vpsolar.com/en/electric-cars-market-statistics/>



On 19th November 2020, as part of European Fire Safety Week organised by the European Fire Safety Alliance, a second pinfa webinar engaged a wide public to discuss the importance of fire safety in the mobility energy transition to electric-powered vehicles. Speakers included fire fighters, a battery fire test company, fire safety experts and researchers into vehicle accident survival and injuries.

Moving online, necessitated by Covid, made informal dialogue more difficult, but there were active exchanges and contacts in the 'Chat'. The webinar format did however enable wider participation, with over 450 participants in total in the two webinars. The October pinfa webinar was held with two live sessions at times set to enable participation from both sides of the Atlantic.

Pinfa will organise further webinars on different themes in 2021, pending hopefully an exit from Covid restrictions, as well as partnering online events organised by other organisations like AMI Flame Retardants in Plastics and the European Fire Safety Week.

The pinfa 2020 e-mobility webinars are summarised in pinfa Newsletter n°120

Replay the webinars here: <https://www.pinfa.eu/media-events/videos/>

Graph based on estimates at <https://www.vpsolar.com/en/electric-cars-market-statistics/>

Manufacturer specifications for materials in electrical vehicles become more demanding or new standards set specific performance levels. Examples include contact corrosion (galvanic), constant colour including after heat and ageing, electrical properties.”

DAVID QI & ANTONIO NERONE,
RadiciGroup High Performance Polymers

Fire continues to kill and injure too many people in Europe. Fire deaths in Europe are equivalent to two Grenfell fires per week.”

ELIE VAN STRIEN, *European Fire Safety Alliance*

Overall, the survivability of vehicle crashes has improved with vehicle design and safety features, but the relative probability of fire death resulting from accidents is increasing.”

PAUL OTXOTERENA, *RiSE*

In over half of car fire fatalities in Sweden, hydrogen cyanide (HCN) was detected. In electrical vehicles, hydrogen fluoride emissions, released from batteries in fire, but also from air conditioning liquids or possibly battery cooling liquids, will increase fire gas toxicity.” **ULF BJÖRNSTIG,**

Senior Professor of Surgery, Umeå University

The Flanders fire safety organisation (Hulpverleningszone Oost) is concerned about new risks to fire-fighters: chemical and thermal risks from batteries (in particular hydrogen fluoride) and electrical risks (400 – 600 V).”

DIETER BRANTS, *Hulpverleningszone Oost*

“ Today’s electric vehicles have a similar heat release rate to conventional vehicles, but this will increase as stored power increases to offer higher km ranges.”

VINCENTE MANS, *fire safety expert*

“ The toxic fire gases found in electric vehicle fires were released at similar levels to conventional vehicles, but additionally: fluoride, cobalt, nickel, manganese and lithium.”

LARS DEREK MELLERT,

Amstein + Walthert Progress

“ This webinar on fire risks in electric vehicles co-organised by pinfa and European Fire Safety Alliance confirmed pinfa’s capacity to contribute to a joint action at the EU level, European Fire Safety Week. The participation of fire and medical experts, and the wide and active attendance enabled discussion on fire safety with new contacts and made the link between flame retardants, electric vehicles and building safety.”

ADRIANA JALBA, *pinfa Board, ICL*

pinfa newsletter – our information hub

The pinfa monthly Newsletter continues to be a recognised information source on innovation in PIN flame retardants and on fire safety. Despite the difficulties of Covid, eleven monthly issues were published in 2020, plus the special issue n°120 covering the pinfa e-mobility webinars.

The pinfa Newsletter covers developments worldwide, providing an update on developments such as fire safety and chemicals policies, publications and studies, new PIN FR chemistries and applications. Back issues of the Newsletter are available on the pinfa website, so providing a reference library for information on PIN FR developments (use the ‘search’ function on the pinfa website).

WIDENING OUR AUDIENCE

In 2020, software problems with the pinfa Newsletter online ‘Subscribe’ system have been resolved, and the system is now fully operational, so enabling us to grow the Newsletter emailing list, which currently has nearly 1 000 subscribers.

The pinfa website brings together information on PIN flame retardants, fire safety, events, documents and links. The website recorded some 14 822 visits in 2020, up by 47% from 2019.

pinfa is now also active on social media: LinkedIn (130 followers and growing) and Twitter (80 followers), enabling more rapid circulation of information ahead of the monthly publication of the Newsletter.

The ‘Product Selector’, on the pinfa website, has been significantly updated in 2020, to bring together coherent information on PIN FRs, searchable by the polymer in which use is intended and by application sector. Information included covers identification (CAS, ECN), regulatory status (REACH, GHS), supplier companies (pinfa member companies) and trade names.

pinfa website and Newsletters: **www.pinfa.eu**

The pinfa Newsletter welcomes input from companies and other stakeholders worldwide on fire safety and FR developments. Please send any news or information of interest to pinfa-consultant@thornton.fr



Smoke toxicity and Flame Retardants

Following the successful Smoke Toxicity campaign performed on polymers by CREPIM on behalf of pinfa in 2019, a new investigation was performed on natural materials and synthetic leather. This was based on a suggestion from the pinfa Advisory Board: “How do the results for polymers compare to natural materials?” CREPIM first performed a bibliographic study highlighting the different behaviours of 4 classes of natural materials: wool, wood, cotton, and leather. The fire-behaviour was documented as depending on several parameters, such as chemical composition and FR treatment, heat source, oxygen supply, type of combustion (flaming or glowing), moisture content, sample shape and size or heating rate.

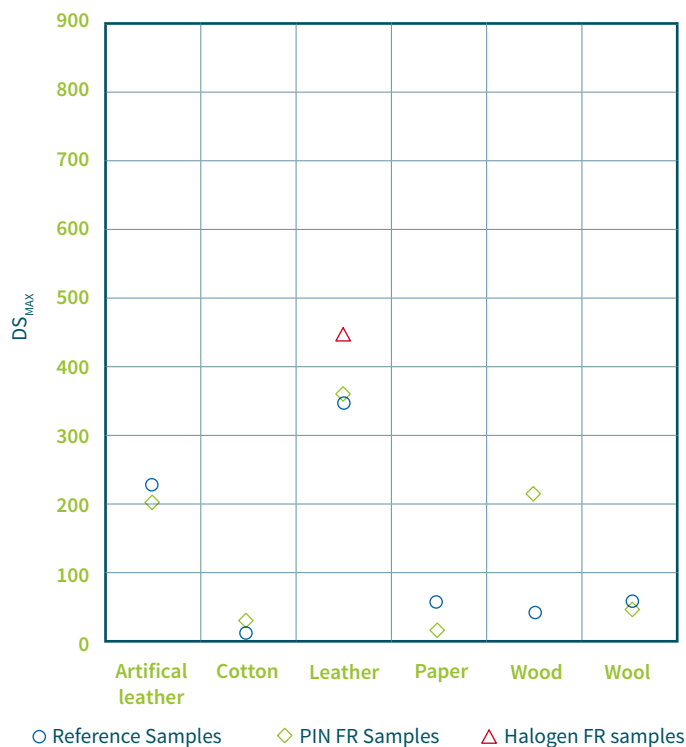
In parallel to this study, CREPIM evaluated experimentally the impact of PIN FR on smoke and toxicity from the following materials: wood, cotton, artificial and natural leather, paper, and wool. Samples were provided by four companies (Budenheim, Clariant, Nabaltec and Thor) and included neat materials for a comparison purpose. Flame retardants included e.g. phosphate ester, ammonium polyphosphate, phosphonates, phosphinates and aluminum trihydroxide. Smoke toxicity was evaluated according to NF X 70-100 at 600°C, which corresponds to a well-ventilated combustion scenario. The yields of 8 toxic gases (CO , CO_2 , HCN , NO_x , SO_2 , HBr , HCl , HF) were measured and the conventional index of toxicity for non-listed products (CIT_{NLP}) was calculated according to EN 45545-2+A1:2016. Smoke density was evaluated according to ISO 5659-2 at 50 kW/m² without pilot flame, and during this test smoke toxicity was evaluated at 4 and 8 min (CIT_g) following EN 45545-2+A1:2016 Annex C.

The literature overview and the test conducted highlight that cellulose-based materials (wood, paper, cotton) emit low levels of smoke, show low toxicity levels (mainly composed of CO and CO_2) and can be marginally impacted by the presence of FRs used in this study. On the other hand, wool materials show low smoke density levels regardless of the FRs. However, wool samples revealed a higher-than-average toxicity which was hardly affected by the FRs studied here. Leather materials show different behaviour based on composition (natural versus synthetic), higher toxicity than cellulose-based materials due to a rich nitrogen and sulfur content, and FRs effect and efficiency on smoke and toxicity varies between different matrixes. Both studies highlight a fire behaviour that is highly dependent on the nature of the considered material, the fire scenario as well as the flame retardant used.



Median DS_{MAX} values

among 6 types of materials and 24 samples tested



Median CIT_{NLP} values

among 6 types of materials and 24 samples tested

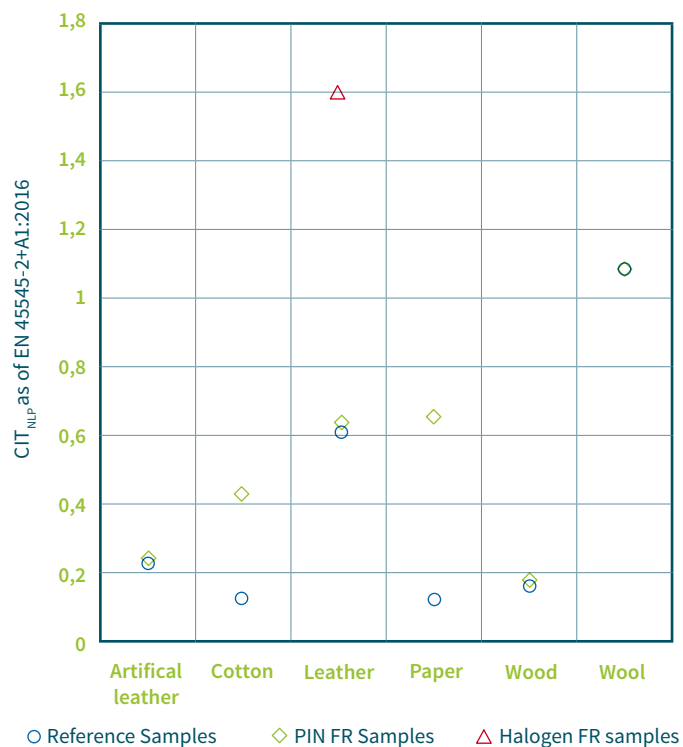


Figure: median values of maximum smoke density (DS_{MAX}) among 24 tested materials measured in the smoke chamber ISO 5659-2 + Annexe C of EN 45545-2+A1:2016 and conventional index of toxicity (CIT_{NLP}) as per NF X 70-100 and Annexe C of EN 45545-2+A1:2016.

Recycling of Flame Retarded Plastics

As a consequence of plastic production, disposal of these products at their end-of-life generates environmental challenges. Among the various disposal possibilities of plastics waste, material recycling is the favoured option from ecological, economical and in particular energetic reasons. Polymeric waste materials are considered as valuable resources for manufacturing new products; preferably, virgin plastics are replaced when similar properties can be achieved. Therefore, the EU plans to enhance quality and the rate of plastic waste recycling. To open new perspectives and applications one potential possibility could be flame retarded recycle materials.

With regard to this scope, the Fraunhofer LBF and members of pinfa are preparing a new research project to come up with flame retardant polymer grades based on recyclates. The aim is to use recycled polyolefins (PP, PE), PET and PA from post-consumer and/or post-industrial waste and “up-cycle” them to flame-retarded grades. The challenge addressed in this project is beside the flame retardancy to come up with a tailor-made stabilization for the recycled materials. Because not only during their lifetime but also in re-processing, plastics are subjected to thermal oxidation and photo-oxidation, which can create enough damage to prevent them from being recycled into high-quality products. New stabilizer formulations can successfully overcome those obstacles, but they need to be developed for a specific waste stream. Such a stabilizer formulation consists of a variety of different substances that synergistically boost the performance and deal with the various flaws of the waste material. Fraunhofer LBF will use its extensive know-how on the effects of polymer additives to tackle the special challenges posed by recycled materials.



pinfa GLOBAL OPERATIONS

pinfa North America



TIM REILLY
CHAIRMAN of pinfa-NA

During 2020, pinfa-NA continued its efforts to promote fire safety through the use of PIN flame retardants. Five pinfa-NA member companies participated in a full day symposium and workshop during February focused on public safety at Case Western Reserve University at Cleveland, Ohio. Tim Reilly, Chairman of pinfa-NA and representing Clariant presented an industry perspective concerning technology trends, regulatory considerations and the steps involved in commercializing a new flame retardant technology. Participants of the public safety workshop breakout sessions discussed how to advance fire safety in North America. Representatives from industry, academia, testing and standards organizations participated.

pinfa-NA continued its work via three standing committees. The Outreach Committee was very active during 2020 especially with participation and financial sponsorship of virtual events including Society of Plastics Engineer's "plastics for aerospace" and "plastics for medical manufacturing". pinfa-NA was present at CAMX Advanced Composites Expo and The Battery Show/ Electric & Hybrid Vehicle Technology

Expo. Margaret Baumann, pinfa-NA Vice-Chair and representing FRX Polymers gave respective presentations concerning "Working toward more sustainable Fire Safety Solutions" and "Electromobility and Fire Safety – Challenges and Trends".

The pinfa-NA membership committee led by Scott Klopfer of Technical Fibre Products focused on improving member value through the pinfa-NA website. Debbie Wagner (pinfa-NA administrator) assisted in this effort. In 2020, pinfa-NA welcomed a new professional member to its organization: Dr. Anteneh Worku of FR-Adviser LLC and the organization looks forward to additional growth during 2021.

The Technical Program Committee's session on Fire, smoke and Toxicity for SAMPE 2020 in Seattle, Washington (Boeing, Safran Cabins, U.S. FAA, UL, 3M, Southwest) has been re-scheduled for May 2021 in Long Beach California. Another major initiative of the TPC is the preparation of a non-halogen flame retardant formulation course. The initial program will

be co-sponsored by SPE. The course is being organized as a virtual program during June 2021 led by course director and pinfa-NA member Roger Avakian who has forty years of experience formulating plastics.

During 2020, Carolyn Pressley of Budenheim assumed a pinfa-NA Vice-Chair position and is leading the effort to refine the vision and mission statement for the NA organization. The current members of pinfa-NA include: Amfine/Adeka, Budenheim, Clariant, FRX Polymers, Huber, Lanxess, Nabaltec, Polyone, Scott Bader, Technical Fibre Products, Avakian Polychem and FR-Adviser LLC. pinfa-NA will be participating in numerous industry events in 2021 including the National Plastics Exposition in Orlando, Florida during May 2021. For further information: www.pinfa-na.org

pinfa China



CINDY LUI
CHAIRMAN of pinfa-CHINA

COVID-19 made the economic development very difficult in 2020, which was extremely hard and bitter for the world. As an organization with a sense of social responsibility, all members of pinfa China have been paying close attention to the epidemic situation in various regions of Hubei Province since the outbreak of the epidemic. When it was known that the medical supplies in the hospital were relatively scarce, pinfa China took immediate action and organized 2400pcs of 3M N95 masks to Huangpi District People's Hospital, trying our best to support the fight against COVID-19. The pinfa China donated masks were delivered to the hospital via Express Green Chanel. We also received a thank-you letter from the Hospital.

In response to the call of the authorities and in order to actively co-operate in the fight against the pandemic, pinfa China has changed most of its planned activities, e.g. from face-to-face to online. The annual workshop was cancelled, and the popularity of the halogen free flame retardants concept was promoted through using new media: pinfa China

WeChat official account paid more attention to the quality of WeChat tweets and forwarded valuable tweets of various platforms. Two online live video classes were scheduled in November and December 2020, where we invited experts from universities or related industries. The experts shared their knowledge of flame retardants and their applications, and answered questions raised by the audience online. The open courses have gained high attention and good effect with over 60 participants. For 2021, pinfa China plans another 9 online events.

Moreover, pinfa China sponsored the 2020 National Flame Retardant Annual Conference. In order to enrich pinfa China's organization image, we translated the English pinfa E&E brochures and distributed them to more than 400 participants.

During 2020, the organization of pinfa China changed: Mr. Engheng Khoo handed over the chairmanship to Ms. Cindy Liu, the former executive chairman of pinfa China. The rotating VP positions have been filled by JLS and Nabaltec.



Thank-you Letter from Wuhan Huangpi Hospital

Pipeline For 2021

As Europe gradually recovers from the COVID-19 pandemic, 2021 will be marked by bold action towards its objective to be climate neutral by 2050, detailed in the European Green Deal. Industry has a key role in this process and the Chemical Strategy for Sustainability will be at the forefront of pinfa's 2021 policy agenda. pinfa will also continue to push forward on existing priorities such as fire safety and circular economy. New this year pinfa launches its new educational toolkit under its new flagship initiative called the 'pinfa Academy'. Stay up to date on all our 2021 activities by visiting our newsroom.



MEET THE TEAM



Dr Adrian Beard
Chairman of pinfa

Adrian Beard works for Clariant Corporation, Hurth near Cologne in Germany, as Head of Marketing and Advocacy for the Flame Retardants Business Line of the Business Unit Additives. On top of his Clariant position, Adrian has been the Chairman of pinfa since November 2016.

He is also a senior expert in fire safety and environmental properties of phosphorus based flame retardants. From 1991 to 1999, before joining Clariant, he was head of the environmental analytical laboratory at the Fraunhofer-Institute for Environmental, Safety, and Energy Technology in Oberhausen, Germany. He holds a doctorate in analytical chemistry from the University of Waterloo, Ontario, Canada and a diploma in geoecology from the University of Bayreuth, Germany.



Esther Agyeman-Budu
Sector Group Manager of pinfa

Esther Agyeman-Budu, has been working for the European Chemical Industry Council (Cefic) since April 2013 in the Innovation Policy unit as Communication and Emerging Science and Policy Issues Manager. In April 2019 she changed roles to become Sector Group Manager in the Specialty Chemicals unit of Cefic and is responsible for several sectors groups, including pinfa, the Phosphorus, Inorganic and Nitrogen Flame Retardants Association. Before joining Cefic, Esther was an undergraduate Communication Instructor at Kent State University. Previous experiences: Corporate Social Responsibility fellow at Johnson and Johnson and a Marketing Specialist for Microsoft Business Solutions. Esther's background is in science and political communication, corporate social responsibility and information science.



Hannane Haddouch
Assistant of pinfa

Hannane Haddouch is a sector group assistant for the Specialty Chemicals department of Cefic.

Since 2011, she provides administrative support to the Secretary General and the pinfa members.



Chris Thornton
Consultant to pinfa Communications

Chris Thornton writes the pinfa Newsletter, which provides monthly information on PIN flame retardants and fire safety. He has been working with the flame retardants industry in Europe since 2001 on information and Newsletter communications, fire safety, life cycle analysis, eco-labels, smoke toxicity and other flame retardant environment and health challenges. He is British born, now living in France. His other activities include sustainable management and recycling of phosphorus.

MEMBERSHIP

FULL MEMBERS

PRODUCERS OF PIN FLAME RETARDANTS



FULL MEMBER

Any producer of Phosphorus, Inorganic and Nitrogen flame retardant chemicals shall be eligible for membership. The membership includes a company's subsidiaries and joint ventures.

ASSOCIATE MEMBER

Associate membership is open to other related technologies, e.g. FR synergists or companies using Phosphorus, Inorganic and Nitrogen flame retardant chemicals (i.e. formulators, blenders, distributors, agents, end users, etc.).

ASSOCIATE MEMBERS

USERS OF PIN FLAME RETARDANTS



In 2020, pinfa welcomed new members : GUSTAV GROLMAN & RADICI



MUTUAL MEMBERSHIPS





Phosphorus, Inorganic & Nitrogen Flame Retardants Association

A sector group of Cefic 

European Chemical Industry Council - Cefic aisbl

EU Transparency Register n° 64879142323-90

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