pinfa
Phosphorus, Inorganic & Nitrogen Flame Retardants Association

# Your newsletter for non-halogen fire safety solutions n° 180 March 2026



## PINFA IN ACTION

pinfa-na
Phosphorus, Inorganic & Nitrogen Flame Retardants Association

### Free webinar: PIN FR solutions for polymers

**22nd April. Oliver Töpfer, Nabaltec, introduction to Mechanisms, Applications and Test Methods for PIN flame retardants**.

*Free pinfa-NA webinar: Wednesday 22nd April 2026, 11:30 - 12:30 EDT (USA) = 17h30-18h30 CEST (Brussels time). pinfa-NA's 22nd Lunch and Learn (L&L) webinar. Registration* https://us02web.zoom.us/webinar/register/WN_6aMuZy1rRICCMK2-rlqPjq

*Watch previous pinfa-NA L&L webinars:* https://www.pinfa-na.org/

### pinfa GA shows active policy work

**Members' meeting shows pinfa's high level of activity in policy, PIN fire safety and chemicals regulation**. pinfa's General Assembly, 18-19 March, Brussels and online, brought together over 30 participants. The pinfa Board and the Cefic team working for pinfa (**Esther, Francesca, Myriam** and **Hannane**) presented the 2025

Activity Report (reserved for Members). pinfa now has 28 members and 2025 showed over 80 pinfa working meetings, conferences and workshops, with pinfa addressing over 20 identified topics. pinfa communications include Q&A's, videos, social media (>1100 LinkedIn followers), the pinfa website, and the pinfa Newsletter (>1600 subscribers).

**Thomas Futterer, Budenheim**, the new pinfa Chairman underlined the challenges and opportunities facing the PIN flame retardant industry, which is at the centre of fire safety, sustainability and circular economy. He presented pinfa's activities to take industry forward, defining strategy, and addressing specific questions through pinfa's active Working Groups. Discussion underlined the essential role of PIN flame retardants to enable industry sectors identified as 'strategic' by the EU, such as renewable energies, batteries, digitalisation and defence.

The pinfa Board strategy meeting early 2026 reported that pinfa brings high added value to Members through outreach and dialogue with regulatory processes and policy makers, and work with OEMs and flame retardant users on sustainability and recycling.

pinfa's proactive work underway was presented, in particular on the EU Chemical Strategy for Sustainability, evaluating migration of PIN FRs in polymers, preparing for regulatory questions on organo-phosphorus PIN FRs and melamine derivatives.

**Carolyn Pressley, Budenheim**, updated on pinfa North America: today 17 members, including active participation in many events and exhibitions and work with Ecotek to partner with schools and students (see pinfa Newsletter n°170).

**Demi Tang, Clariant**, updated on pinfa China: today 12 members, 2700 followers on WeChat, active presence at major industry conferences, working groups on PIN FRs in automotive plastics recycling and on high-rise buildings.

Breakout sessions enabled the pinfa members to discuss priorities for policy work: cooperation with the value-chain on Classification of some PIN FRs, taking forward studies on recycling of PIN FR polymers, optimising information for pinfa members and communication of pinfa's actions.

The pinfa General Assembly welcomed a presentation from **Georg Streck, European Commission DG GROW** F1 (chemicals), updating about preparation of regulatory actions on aromatic brominated flame retardants, and about data collection on aliphatic brominated and certain organophosphorus flame retardants. He presented Commission support for substitution to environmentally preferable solutions. This presentation will be summarised in next month's pinfa Newsletter.

# PUBLIC CONSULTATIONS

## EU surveys to input to Fire Safety Guidance

**The European Commission is looking for input to prepare Guidance on Fire Safety in building renovation & electrification**.

**Surveys are open to 10th April 2026**

The future Guidance, to be developed for the European Commission DG GROW (Fire Information and Exchange Platform, FIEP) aims to support implementation of the Energy Performance of Buildings Directive (EPBD). Stakeholder input is requested on:

a) solar installations: survey link
b) insulation and building envelope: survey link
c) energy storage systems (ESS): survey link
d) other technical building elements: survey link

The four surveys request information on available studies and data, other existing guidelines or good practices for fire safety, key aspects to be addressed, main technologies today and expected in the future, prescriptive or performance-based approaches, and proposals for other topics beyond the four proposed above.

*Open to 10th April 2026, four EU surveys for the project "Guidance on Fire Safety Linked to the Electrification and Renovation of Buildings" (FS-REBuild) https://www.frissbe.eu/research/projects-secured for the European Commission DG GROW Fire Information and Exchange Platform (FIEP) https://efectis.com/en/fire-information-exchange-platform-fiep-2/*

*Practical notes: for each questionnaire: you can save a pdf version of the whole questionnaire and of your draft input, and save draft input to come back later to complete. The text boxes in the survey are LIMITED to 5000 characters (spaces included).*

*Contact: fs-rebuild@dbigroup.dk*

## Simplification of environmental regulation

**Public consultation on outline plans to simplify environmental reporting and other environmental regulatory requirements**. Open to 7th May. The measures are titled "Simplifying for sustainable competitiveness" and are outlined in a Commission Communication (10 pages) with further detail in an accompanying Staff Working Document (30 pages), both open for public comment. The Commission's proposals include a non-specific reference to possible future "targeted revision" of the EU chemicals regulation REACH

*EU public consultation open to 7th May 2026. "Simplification of administrative burdens in environmental legislation" - input = 4000 characters plus optional document: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/14794-Simplification-of-administrative-burdens-in-environmental-legislation-_en*

*European Commission, 10th February 2026 "Simplifying for sustainable competitiveness", Communication COM(2025)990 (10 pages) and Staff Working Document COM(2025)980 final (30 pages) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025SC0990&locale=en*

## UK consultation on construction products

**Two UK Government public consultations, including a "general safety requirement" for safety of construction productions**. Open to 20th May. The first consultation is on a White Paper, which follows the Green Paper published in February 2025 (see pinfa Newsletter n°170) addressing recommendations of the Grenfell fire tragedy Enquiry covering, accountability, digital traceability, enforcement, construction product compliance and testing … The second consultation proposes to introduce mandatory safety requirements for all construction products used in the UK, because it is estimated that around 2/3 of products currently used are not covered by current specific standards or by the Construction Products Regulation. The General Safety Requirement for Construction Products proposes to include mandatory risk assessment in use, product information, labelling and traceability, storage and transport, safety monitoring.

*UK consultation open to 20th May: "Construction Products Reform White Paper" https://www.gov.uk/government/consultations/construction-products-reform-white-paper*

*UK consultation open to 20th May: "General Safety Requirement for Construction Products https://www.gov.uk/government/consultations/general-safety-requirement-for-construction-products*

## EU proposed "Industrial Accelerator Act"

**The European Commission has submitted to Parliament and Council a proposed Industrial Accelerator Act**, aiming to boost EU raw materials, chemicals, automotive component and net-zero technology industries. The Act will incite public procurement and incentives ("Made in EU"), set conditions for large foreign investments in certain industries, facilitate site permitting and create "Industrial Acceleration Areas". The Act adds to existing tools or processes such as the EU Critical Chemicals Alliance and the European Chemicals Industry Action Plan (COM(2025)530, pinfa Newsletter n°173),

*European Commission proposal for a Regulation "Industrial Accelerator Act", 4th March 2026 https://single-market-economy.ec.europa.eu/publications/industrial-accelerator-act_en*

# FIRE SAFETY

## All passengers escape safety from train fire

**A fire started in a train near Lyon, France, apparently in the pantograph system. All 210 passengers were evacuated.** 25 persons were identified as impacted by smoke, and one person was hospitalised after fainting. The fire is said to have started in the high-voltage (1500V) pantograph which supplies power to the train. Photos show that the fire did not significantly spread over the train. This incident again shows that high fire safety standards and flame retardant materials used in modern trains limit fire risks, despite the considerable use of potentially flammable materials in composite bodywork, cables, electrical and electronic systems, interior fittings, seats, carpets etc.

*"Ca a commencé à crier Il y a de la fumée ! ce qu'on sait de 'évacuation de 210 passagers d'un train à Vienne", Dauphiné Libéré, 26 mars 2026https://c.ledauphine.com/faits-divers-justice/2026/03/26/ca-a-commence-a-crier-il-y-a-de-la-fumee-il-y-a-de-la-fumee-ce-qu-on-sait-de-l-evacuation-de-210-passagers-d-un-train?login=1*

# PIN FR INNOVATION & RESEARCH

## SpecialChem selection showcases PIN FRs

**Online speciality chemicals site SpecialChem monthly focus on Safer-by-Design flame retardants.** SpecialChem says that "with the rising PFAS and antimony scrutiny, flame retardant formulation is under pressure" and highlights integrated PIN FR solutions and ATO-alternatives.

SpecialChem also provides a 25+ page 'Guide' to FRs in plastics, covering how FRs work, different impacts on fire behaviour and smoke emission, various types of FR, FR selection criteria for different types of FR and for different polymers and market applications.

Company flame retardant offers highlighted are all PIN FRs:

- Tolsa (pinfa member) specialist organo-clay synergists intended to enable partial or complete ATO replacement, improve flame resistance, limit heat release and reduce smoke.
- Elementis organo-clay synergists, stated to act as synergists with PIN FRs to deliver anti-drip and improved char formation (fire performance) without PFAS.
- CAI Performance Additives melamine cyanurate based PIN FR for polyamides (see pinfa Newsletter n°178).

SpecialChem also offers a webinar with **Camillo Cardelli, SILMA**, masterbatch specialist, on improving cable production and increasing extrusion speed using PIN FR compounds with decreased viscosity and lower water absorption, including for B2ca d0 CPR cable classification.

*"Non-toxic Flame Retardants: Safer by Design", SpecialChem monthly Focus February 2026, https://www2.specialchem.com/focus-of-the-month-non-toxic-flame-retardants-safer-by-design*

*"Overcome the process limitations of HFFR compounds to increase extrusion speed", SpecialChem webinar with Camillo Cardelli, SILMA, Camillo Cardelli of SILMA https://www.specialchem.com/polymer-additives/webinar/overcome-the-process-limitations-of-hffr-compounds-to-increase-extrusion-speed*

## Phosphorus FR radical FR mechanism

**PO· radical formation is analysed for phosphorus PIN flame retardants on cotton, to understand gas phase fire protection.** Formation of PO· radicals from Triethyl phosphate (TEP), Tris-phosphoramidate (TD) and Diethyl phosphoramidate (DEPAm), both neat and on cotton, were studied in controlled pyrolysis chambers Neat DP, DEPAm and TEP do not generate PO· radicals. Neat TD releases mainly diethylmethylphosphte (DEMP) and TEP from 250 – 300 °C upwards and then ethene at higher temperatures, as well as diethylamine and other nitrogen compounds from around 350°C. TD-coated cotton however shows more complex

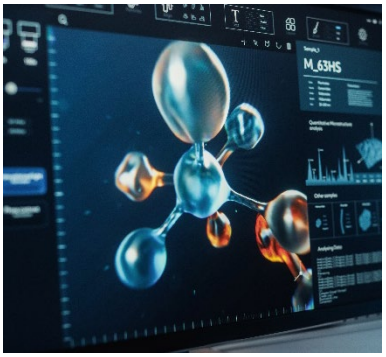
decomposition products, including four main P species (phosphorus oxide, phosphenous acid HOPO, DEPAm, TEP) from 300 – 360°C with phosphorus radical PO· formation from 400°C. The authors conclude that PO· radical formation (which contributes to gas-phase flame retardant action: fire quenching) results from the PIN FR – substrate reaction not from the PIN FR alone, so can be modified by e.g. FR-substrate cross-linking.

*"On the hunt for the PO radical: How substrate interactions shape the gas-phase mechanism of phosphoramidate flame retardants", N. Tomasik, R. Otto, T. Mayer-Gall, B. Atakan et al., Polymer Degradation and Stability 248, 112025 https://doi.org/10.1016/j.polymdegradstab.2026.112025*

## Recycled FR fabrics in sustainable interiors

**Begoodtex promotes eco-friendly fire retardant textiles and recycled PIN FR fabrics for sustainable interior design**. Textiles from secondary polyester with PIN flame retardants are adapted for furnishings and interior architecture, automotive, buses and aviation. They are indicated to use non-halogenated flame retardants to achieve wash durability and fire safety standards such as FMVSS 302, DIN 75200 and EN 13501 with reduced environmental footprint. They can also obtain OekoTex environmental certification. Shaoxing Begoodtext, China, has 17 years' experience in flame-retardant textiles, with production capacity of 3 million metres.

*"Recycled Flame Retardant Fabrics in Sustainable Architecture", Begoodtex, 15 March 2026 https://begoodtex.com/recycled-flame-retardant-fabrics-sustainable-architecture/*




## Biobased anti-drip for PIN FR polyamide

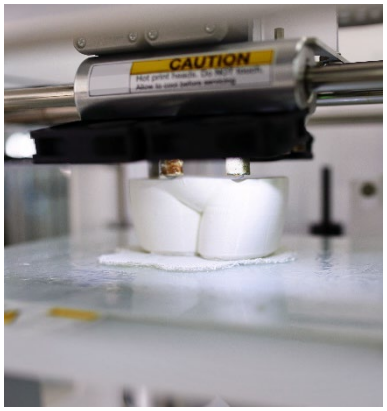
**A boron-nitrogen-phosphorus-AlPi PIN FR achieves UL 94 V-0 in PA6 loading, and no burning drip with 1% modified daidzein.** Daidzein is a natural isoflavone found in soy beans and other legumes. The boron-phosphorus PIN FR was laboratory synthesised by reacting 4-formylphylybroronic acid with 1,6-hexanediamine, DOPO and AlPi (aluminium diethylphosphinate). Both AlPi and this novel boron-nitrogen-phosphorus-aluminium PIN FR achieved UL 94 V-0 (1.6 mm) at 12% loading in polyamide-6, with LOI increased to c. 30 from c. 24 for neat PA6, and peak heat release rate reduced to 580 (AlPi) – 560 (BNP PIN FR) from 720 for neat PA6. Replacing 0.8 – 1% of the BNP PIN FR by modified daidzein prevented dripping whilst maintaining fire performance (UL 94, LOI, PHRR).

*"A key role of a bio-based charring-coupling agent in flame retardant and anti-dripping performance of polyamide 6/aluminum diethylphosphinate", W. Zhang et al., J Appl Polym Sci. 2023, 140:e54327,*

# RESEARCH REFERENCE BOOK


## Flame Retardant Selection for Polymers

**380-page book presents FR selection for different polymer types, foams, cables, textiles, adhesives and for 3D-printing.** The 24 contributing authors are from leading research centres worldwide, from consulting or from fire testing. The book presents basic principles of flame retardants (fire protection, formulation, processing), discusses in detail regulations and testing and FR selection for different polymers (thermoplastics, biopolymers) and applications (foams, cables, textiles, adhesives, additive manufacturing), and specifically addresses trends in China, and developments in regulation, sustainability and circularity.




## FR selection for Additive Manufacturing

**50-page chapter discusses flame retardants for SSL (selective laser sintering) 3D-printing polyetherimide and PPSF/PPSU** as seen by Sarak Sigamneni and Fifan Lv, Auckland Technical University, Australia. Some FR polymers today available for SSL (selective laser sintering) and FDM (fused deposition modelling) printers are presented. Polymers used by these technologies are discussed: polyamides, polyaryl ether ketones (PAEK), amorphous polyetherimide (PEI), polyphenylsulphone (PPSF/PPSU). A challenge is that FRs can deteriorate the printability of polymers and the mechanical performance of the 3D-printed article. New FR chemistries, improved FR dispersion, and adaptations to Additive Manufacturing technologies may address this challenge.

## Challenges and innovations

**The book's final 6-page chapter discusses future challenges and innovations for flame retardant polymers,** as seen by Henri Vahabi, Lorraine University, France and Mohammed Reza Saeb, Gdansk Medical University, Poland. The complexities of formulation of FRs with polymers are underlined, in particular compatibility with the polymer(s) and with other additives, ensuring effective dispersion and stability in the polymer matrix. Sustainability is identified as an important driver for innovation, in particular the move to replace halogenated FRs. Opportunities for flame retardant innovation are identified in 3D-printing, which has specific needs for FR-polymer compounds; in the application of machine learning to accelerate design of new FR molecules and support formulation; and the need for FR solutions to help address the specific fire safety challenges of batteries and of next-generation computer equipment.

Challenges identified for FR development and polymer compound formation include:

- Scale-up from R&D to industrial production and regulatory authorization,
- Extrapolating understanding of FR fire performance from small-scale tests,
- Designing synergies between several FRs in formulations,
- Placing FRs at key sites within 3D-printed articles to achieve fire safety, minimise overall FR load, optimise polymer performance,
- Development and industrial implementation of bio-based FRs,
- Nano-scale FRs: balancing performance and dispersion benefits versus possible regulatory concerns,
- Using machine learning to predict fire performance of polymer – FR formulations,
- Sustainability: circularity, life cycle assessment.

*"Flame retardant selection for polymers", 377 pages, edited by H. Vahabi, M. Reza Saeb, G. Beyer, Elsevier 2025, ISBN 978-0-443-22247-4*
*https://shop.elsevier.com/books/flame-retardant-selection-for-polymers/vahabi/978-0-443-22247-4*

# PUBLISHER INFORMATION

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