Polymeric flame retardants are part of the problem, not the solution

Flame retardant chemicals have been added to products including furniture foam, electronics, children's products, and building insulation to meet flammability standards. However, many of these standards don't increase fire safety and lead to the unnecessary use of toxic chemicals.[1] In recent years, flame retardants have come under intense public scrutiny since they are linked with elevated cancer risk, developmental and reproductive harm, and hormone disruption.[2]

Manufacturers claim that the polymeric versions of flame retardants are safe, but this isn't necessarily true.

Some polymeric flame retardants are known to be toxic. Others haven't been proven safe.

Polymeric flame retardants are used in foam insulation[3] and textiles[4], and likely used in cars, electronics and other products. These newer kinds of flame retardants connect many individual chemical units to form very large molecules known as polymers.

The chemical industry previously claimed that toxic and now mostly phased-out or banned PBDE (polybrominated diphenyl ether) and HBCD (hexabromocyclododecane) flame retardant chemicals were totally safe. Those claims were proved false. Now, the industry is making the same claims about polymeric flame retardants. Yet, as documented in the award-winning Chicago Tribune investigation "Playing With Fire," two powerful industries — Big Tobacco and chemical manufacturers — spent decades waging deceptive campaigns that led to the proliferation of flame retardant chemicals, which don't even work as promised.[5] Like Big Tobacco, the chemical industry simply cannot be trusted when it comes to claims of safety about their toxic products.

Why polymeric flame retardants raise red flags:

- **Polymeric flame retardants have not been proven safe**
  The chemical industry keeps information about polymeric flame retardants secret. There is little disclosure of the products containing polymeric flame retardants, much less their chemical structures or potential breakdown products. Moreover, current regulations require minimal human and ecosystem exposure and toxicity evaluation of polymeric flame retardants or their degradation products, leading to large data gaps.[6] Simply put, polymeric flame retardants haven't been sufficiently tested for safety, and there is good reason to assume they are toxic until proven otherwise.

- **Polymeric flame retardants have a toxic lifecycle**
  The manufacture, use and disposal of polymeric flame retardants pose serious health and environmental concerns. As just one example, polymeric flame retardants used in foam insulation can release chemicals into the air and water during the production and installation of insulation, as well as during building demolition, during structure fires, and after disposal through landfills or incineration.[7] Halogenated polymeric flame retardants emit cancer-causing dioxins and furans when burned, endangering first responders and front-line communities living near incinerators and landfills.[8,9,10] One common polymeric flame retardant (PolyFR) is made from the known carcinogens styrene and butadiene[11] and breaks down into molecules that may be toxic.[12] Polymeric flame retardants in products also raise concerns for recycling as studies find that children's toys[13] and kitchen utensils[14] made with recycled plastic contain flame retardants.

- **Many polymeric flame retardants are persistent by design**
  Some polymeric FRs, rather than being added to plastics, are solid plastics themselves. This means they are likely to break down slowly in the environment and can release small particles (microplastics).[15] Many polymeric flame retardant products being made today will be around for centuries or millennia.

- **Chemical flame retardants may not be needed for fire safety**
  In many cases, products can be made with materials, construction, and design such that no chemical flame retardants are needed to provide fire safety. Legislatures and government agencies have reached exactly that conclusion when it comes to furniture and children's products. In addition, many government flammability standards need to be overhauled to better reflect real-life fire risks and allow for innovative design alternatives that create true fire safety.

We need better policy to address concerns:

- **Don't exempt polymeric flame retardants:** Polymeric flame retardants should not be exempted from safety testing, reporting requirements or regulatory restrictions solely based on being classified as polymers. There is simply too much we still don't know about their safety — and too many concerns raised from what we do know — to give them a pass. In the absence of comprehensive safety testing data we should assume polymeric flame retardants are toxic like other flame retardants.

- **At a minimum, ban halogenated flame retardants:** It is clear that the halogenated versions should not be used.[16] Halogenated flame retardants contain at least one atom of bromine, chlorine, fluorine or iodine bonded to a carbon atom, which transform into highly carcinogenic compounds when burned.[17,18] The European Union and the State of New York have banned all halogenated flame retardants (HFRs) from use in the enclosures and stands of televisions and certain other electronics.[19] Apple and HP have also phased HFRs out of all of their electronics.[20]

- **Require transparency:** Chemical producers should be required to disclose what flame retardants are being used in what kinds of products. They should also be required to disclose the chemical structures of their products, as well as the results of any safety testing that has been conducted. Product manufacturers should be responsible for knowing what kinds of chemicals are being added to their products, including flame retardants, and the presence of flame retardants in products should be disclosed to consumers.

- **Require more safety testing:** Bad actor chemicals like HFRs should never be allowed. For all other chemicals, including polymeric flame retardants, we need rigorous health and safety testing prior to use in products. It is especially important that manufacturers of the polymeric fire retardants used at very high volumes conduct much more safety testing of the polymers and their associated breakdown products. Manufacturers should fully disclose the results of all tests to the public.

- **Revise flammability standards:** We need to redesign many existing flammability standards to address fire safety without compromising human and ecological health. For example, a California furniture flammability standard known as TB 117 was found to not be effective at reducing fire risk while essentially requiring the use of toxic chemicals. The standard was updated in 2013 to better protect people from both fire and health related threats and was adopted as a national standard in 2021.[21] Similar revisions are needed for other flammability standards such as building insulation, vehicles, and electronics.[22]

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[1] Charbonnet JA, Weber R, Blum A. Flammability standards for furniture, building insulation and electronics: Benefit and risk. Emerging Contaminants. 2020 Jan 1;6:432-41.
[2] Ibid.
[3] Minet L, Blum A, Fernández SR, Rodgers KM, Singla V, Soehl A, Diamond ML. High production, low information: We need to know more about polymeric flame retardants. Environmental Science & Technology. 2021 Feb 23;55(6):3467-9.
[4] SAYTEX® HP-7010 Flame Retardant. https://www.albemarle.com/storage/wysiwyg/brom_saytex_hp-7010_tds_121918.pdf
[5] Playing with fire: Chemical companies, Big Tobacco and the toxic products in your home *Chicago Tribune*. https://media.apps.chicagotribune.com/flames/index.html
[6] Minet L, Blum A, Fernández SR, Rodgers KM, Singla V, Soehl A, Diamond ML. High production, low information: We need to know more about polymeric flame retardants. Environmental Science & Technology. 2021 Feb 23;55(6):3467-9.
[7] Ibid.
[8] "HBCD Is on the Way out – but Use of Questionable Alternatives Will Persist." Green Science Policy Institute. https://greensciencepolicy.org/news-events/blog/hbcd-is-on-the-way-out-but-use-of-questionable-alternatives-will-persist.
[9] "Double Jeopardy: Firefighters Face Physical and Chemical Threats." Green Science Policy Institute. https://greensciencepolicy.org/news-events/blog/double-jeopardy-firefighters-face-physical-and-chemical-threats.
[10] Cristale, J., Belé, T.G.A., Lacorte, S. and de Marchi, M.R.R., 2019. Occurrence of flame retardants in landfills: A case study in Brazil. Environmental Research, 168, pp.420-427.
[11] Hays, Brooks. "'Eco-Friendly' Foam May Pose Environmental, Human Health Risks." UPI. UPI, February 23, 2021. https://www.upi.com/Science_News/2021/02/23/flame-retardant-polyfr-toxic/8341614096712/.
[12] Koch C, Sures B. Degradation of brominated polymeric flame retardants and effects of generated decomposition products. Chemosphere. 2019 Jul 1;227:329-33.
[13] International Pollution Elimination Network. Pops Recycling Contaminates Children's Toys with Toxic Flame Retardants. https://ipen-china.org/sites/default/files/documents/toxic toy report 2017 update v2 1-en.pdf.
[14] Kuang J, Abdallah MA, Harrad S. Brominated flame retardants in black plastic kitchen utensils: Concentrations and human exposure implications. Science of The Total Environment. 2018 Jan 1;610:1138-46.
[15] European Parliament. The environmental impacts of plastics and micro-plastics use, waste and pollution: EU and national measures. https://www.europarl.europa.eu/RegData/etudes/STUD/2020/658279/IPOL_STU(2020)658279_EN.pdf.
[16] DiGangi, J., Blum, A., Bergman, Å., de Wit, C. A., Lucas, D., Mortimer, D., Schecter, A., Scheringer, M., Shaw, S. D., & Webster, T. F. (2010). San Antonio Statement on Brominated and Chlorinated Flame Retardants. Environmental Health Perspectives, 118(12), A516–A518. https://doi.org/10.1289/ehp.1003089
[17] "HBCD Is on the Way out – but Use of Questionable Alternatives Will Persist." Green Science Policy Institute. https://greensciencepolicy.org/news-events/blog/hbcd-is-on-the-way-out-but-use-of-questionable-alternatives-will-persist.
[18] "Double Jeopardy: Firefighters Face Physical and Chemical Threats." Green Science Policy Institute. https://greensciencepolicy.org/news-events/blog/double-jeopardy-firefighters-face-physical-and-chemical-threats.
[19] Charbonnet JA, Weber R, Blum A. Flammability standards for furniture, building insulation and electronics: Benefit and risk. Emerging Contaminants. 2020 Jan 1;6:432-41.
[20] Communication to Toxic-Free Future and Mind the Store, May 1, 2020
[21] U.S. Consumer Product Safety Commission. Standard for the Flammability of Upholstered Furniture. April 9, 2021. https://www.federalregister.gov/documents/2021/04/09/2021-06977/standard-for-the-flammability-of-upholstered-furniture.

[22] Charbonnet JA, Weber R, Blum A. Flammability standards for furniture, building insulation and electronics: Benefit and risk. Emerging Contaminants. 2020 Jan 1;6:432-41.