The Way Forward:

PFAS as a Blueprint for Emerging Contaminants
Scientific Strategy for Change
Science + Communication + Decision Makers = Change

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Convene business, government, academia, NGOs

Scientific Research

Communicate

Government Policy & Business Purchasing Change
Six Classes Videos

PFAS 1  Anti-microbials 2  Flame Retardants 3  Bisphenols + Phthalates 4  Some Solvents 5  Certain Metals 6

www.SixClasses.org

Healthier products, healthier people in four minutes!
Regrettable Substitution

Decabromodiphenyl ether
Concerns:
• Persistence
• Bioaccumulation
• Toxicity

Decabromodiphenyl ethane
Concerns:
• Persistence
• Bioaccumulation
• Toxicity

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Flame Retardant (FR) Standards
California Technical Bulletin 117

- Required foam to withstand a small open flame for 12 seconds

- No overall fire safety benefit
  - fires start in fabric not filling
  - FRs make fires more smoky & toxic

- Smolder standard for fabric can
  - stop most fires before reaching foam
  - increase fire safety without the need for flame retardants

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$23.2 million flame retardant industry lobbying against fire safety without flame retardants

Money to Burn
The chemical industry spent at least $23 million to lobby California officials and donate to legislators’ campaigns during the past five years, when five flame retardant bills were rejected by the Legislature. Click on chart to view data.

Campaign donations to legislators
“Other payments to influence”
Lobbying firms
In-house lobbyists
Meals and other lobbying activities
PAC payments


Funded by Californians for Fire Safety
Albemarle, Chemtura (purchased by Lanxess), Israel Chemicals LTD (ICL)
Identification of Flame Retardants in Polyurethane Foam Collected from Baby Products

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Supporting Information

ABSTRACT: With the phase-out of PentaBDE in 2004, alternative flame retardants are being used in polyurethane foam to meet flammability standards. However, insufficient information is available on the identity of the flame retardants currently in use. Baby products containing polyurethane foam must meet California state furniture flammability standards, which likely affects the use of flame retardants in baby products throughout the U.S. However, it is unclear which products contain flame retardants and at what concentrations. In this study we surveyed baby products containing polyurethane foam to investigate how often flame retardants were used in these products. Information on when the products were purchased and whether they contained a label indicating that the product meets requirements for a California flammability standard were recorded. When possible, we identified the flame retardants being used and their concentrations in the foam. Foam samples collected from 101 commonly used baby products were analyzed. Eighty samples contained an identifiable flame retardant additive, and all but one of these was either chlorinated or brominated. The most common flame retardant detected was tris(1,3-dichloroisopropyl) phosphate (TDCPP; detection frequency 36%), followed by components typically found in the Firemaster550 commercial mixture (detection frequency 17%). Five samples contained PBDE congeners commonly associated with PentaBDE, suggesting products with PentaBDE are still in-use. Two chlorinated organophosphate flame retardants not previously documented in the environment were also identified, one of which is commercially sold as V6 (detection frequency 15%) and contains tris(2-chloroethyl) phosphate (TCEP) as an impurity. As an addition to this study, we used a portable X-ray fluorescence (XRF) analyzer to estimate the bromine and chlorine content of the foam and investigate whether XRF is a useful method for predicting the presence of halogenated flame retardant additives in these products. A significant correlation was observed for bromine; however, there was no significant relationship observed for chlorine. To the authors knowledge, this is the first study to report on flame retardants in baby products. In addition, we have...
ABSTRACT: California’s furniture flammability standard Technical Bulletin 117 (TB 117) is believed to be a major driver of chemical flame retardant (FR) use in residential furniture in the United States. With the phase-out of the polybrominated diphenyl ether (PBDE) FR mixture PentaBDE in 2005, alternative FRs are increasingly being used to meet TB 117; however, it was unclear which chemicals were being used and how frequently. To address this data gap, we collected and analyzed 102 samples of polyurethane foam from residential couches purchased in the United States from 1985 to 2010. Overall, we detected chemical flame retardants in 85% of the couches. In samples purchased prior to 2005 (n = 41) PBDEs associated with the PentaBDE mixture including BDEs 47, 99, and 100 (PentaBDE) were the most common FR detected (39%), followed by tris(1,3-dichloroisopropyl) phosphate (TDCPP; 24%), which is a suspected human carcinogen. In samples purchased in 2005 or later (n = 61) the most common FRs detected were TDCPP (52%) and components associated with the Firemaster550 (FM 550) mixture (18%). Since the 2005 phase-out of PentaBDE, the use of TDCPP increased significantly. In addition, a mixture of nonhalogenated organophosphate FRs that included triphenyl phosphate (TPP), tris(4-butylphenyl) phosphate (TBPP), and a mix of butylphenyl phosphate isomers were observed in 13% of the couch samples purchased in 2005 or later. Overall the prevalence of flame retardants (and PentaBDE) was higher in couches bought in California compared to elsewhere, although the difference was not quite significant (p = 0.054 for PentaBDE). The difference was greater before 2005 than after, suggesting that TB 117 is becoming a de facto standard across the U.S. We determined that the presence of a TB 117 label did predict the presence of a FR; however, lack of a label did not predict the absence of a flame retardant. Following the PentaBDE phase out, we also found an increased number of flame retardants on the market. Given these results, and the potential for human exposure to FRs, health studies should be conducted.
Consensus Statement

San Antonio Statement on Brominated and Chlorinated Flame Retardants

Joseph DiGangi, Arlene Blum, Åke Bergman, Cynthia A. de Wit, Donald Lucas, David Mortimer, Arnold Schecter, Martin Scheringer, Susan D. Shaw, Thomas F. Webster

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Industry Support

Elimination of Fire Retardants in Office Furniture

“...the risks associated with the use of these chemicals is greater than the hazard associated with the risk from furniture without fire retardants.”

- Business & Institutional Furniture Manufacturer’s Assoc.
“A deceptive campaign by industry brought toxic flame retardants into our homes and into our bodies. And the chemicals don’t even work as promised.”
New California Standard

Increased fire safety without flame retardants!
Large Purchasers Move the Market

Material Buyers Club

- Require transparency from manufacturers
- Utilize collective purchasing power to create a demand for healthier products and materials
<table>
<thead>
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<th>Study</th>
<th>Journal</th>
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<tr>
<td>Flame retardants in baby products</td>
<td>ES&amp;T</td>
<td>2011</td>
<td>24,849</td>
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<tr>
<td>Novel and High Volume Flame Retardants in Couches</td>
<td>ES&amp;T</td>
<td>2012</td>
<td>7,233</td>
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<td>Highly fluorinated chemicals in U.S. drinking water</td>
<td>ES&amp;T Letters</td>
<td>2016</td>
<td>49,736</td>
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<td>Highly fluorinated chemicals in fast food</td>
<td>ES&amp;T Letters</td>
<td>2017</td>
<td>29,278</td>
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<tr>
<td>Scientific Basis for Managing PFAS as a Chemical Class</td>
<td>ES&amp;T Letters</td>
<td>2020</td>
<td>25,477</td>
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Green Science Policy Communications Strategy

• Collaborate with expert authors at multiple institutions.
• Select research topic to support policy in public interest.
• Publish open access.
• After acceptance, select a publication date for maximum impact (Two weeks or more in the future).
• Compose release in accessible language with a “hook”.
• Query journalists & then share embargoed release & paper.
• Educate journalists & establish relationships.
• Hope it is not a big news day.
• Utilize paper to affect change.
Science + Communication + Government & Business = Change

A Healthier Future With Less Chemicals of Concern

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