



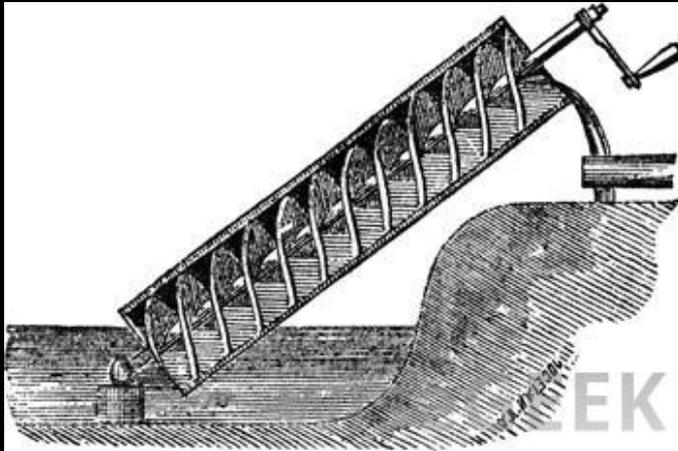
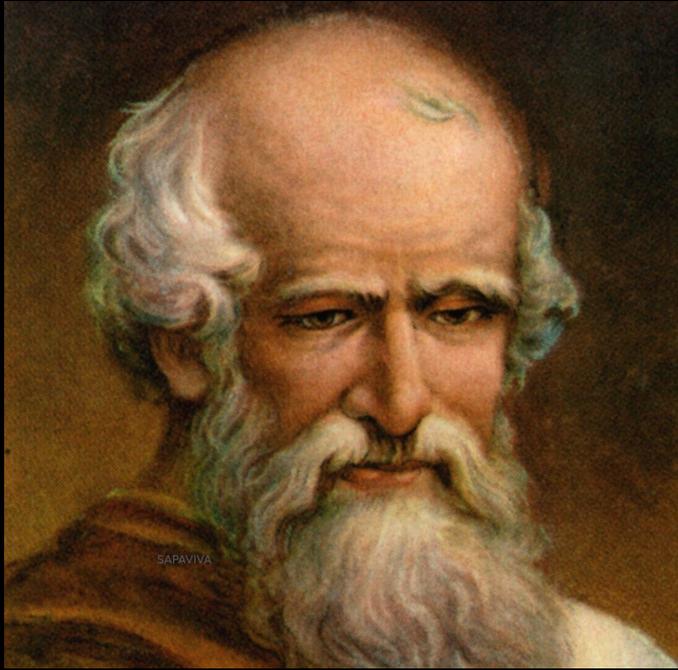
GREEN SCIENCE
POLICY INSTITUTE

Sewers to Slabs: Radically Reimagining a Less Toxic World

Joe Charbonnet

DTSC-ECL Seminar

July 10, 2019





LIVE



STORMWATCH

Severe Flooding

SUN VALLEY

12:52 55°



kcal9.com

COMMUNITIES (UNTIL 4am FRIDAY) DAMAGING SURF FROM ASTRONOMICAL HIGH TIDES AND STO

February 17, 2018
Sun Valley, Los Angeles





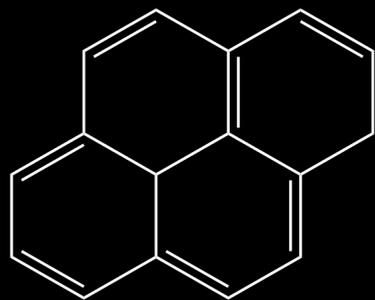
Diuron
Herbicide



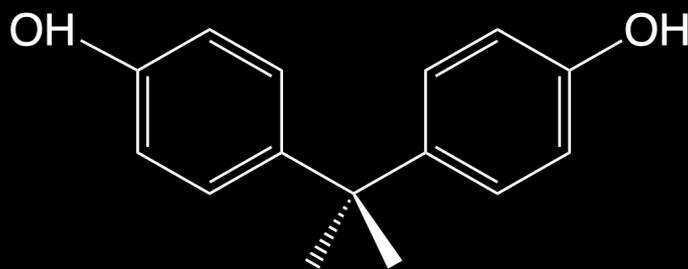
Mercaptobenzothiazole
Tire Wear Product

Pb

Lead
Legacy Soil Contaminant



Pyrene
Auto Exhaust Product



Bisphenol A
Plasticizer

Cu

Copper
Break Wear Product



Man Sand

Man Sand

Man Sand

JAN
M.G.



Rory Shaw Park, 2025
Sun Valley, Los Angeles



GREEN SCIENCE POLICY INSTITUTE

BR I BUILDING RESEARCH & INFORMATION (202) 498-738-755

INFORMATION PAPER

File Building Insulation: Building Codes

Novel and High Volume Use Flame Retardants in US Couches

Reflective Coatings on PentabDE Phase Out

Fluorinated Polyethylene Glycol in U.S. Fast Food Packaging

Detection of Poly- and Perfluoroalkyl Substances (PFASs) in U.S. Drinking Water Linked to Industrial Sites, Military Fire Training Areas, and Wastewater Treatment Plants

ABSTRACT: Drinking water contamination with poly- and perfluoroalkyl substances (PFASs) poses risks to the developmental, immune, metabolic, and endocrine health of consumers. We present a spatial analysis of 2013–2015 national drinking water PFAS concentrations from the U.S. Environmental Protection Agency's (US EPA) third Unregulated Contaminant Monitoring Rule (UCMR3) program. The number of industrial sites that manufacture or use these compounds, the number of military fire training areas, and the number of wastewater treatment plants are all significant

Hydrological units with detectable PFASs



Education



Retreats

Research

Policy & Purchasing Change



PFAS Central: sharing notable news, scientific papers & events



NEWS

**Chemours says DuPont
lowballed environmental**



SCIENCE

**Emerging per- and
polyfluoroalkyl substances**



POLICY

**Senate vote requires military,
EPA to deal with harmful**

A central source for PFAS-related news, science, and events.

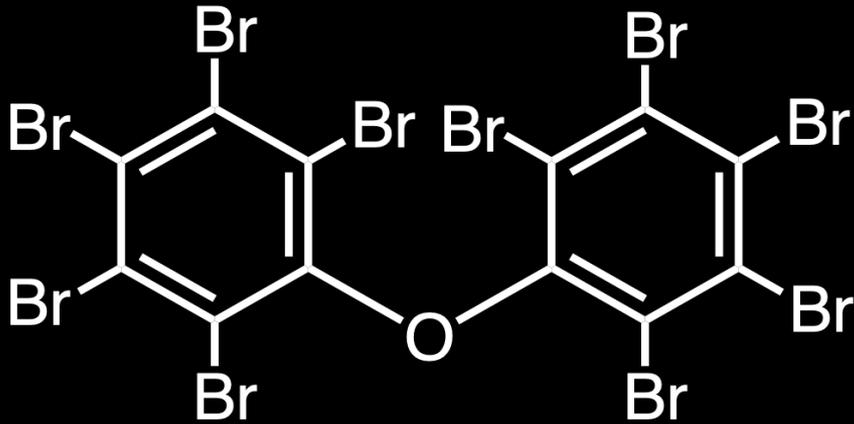
Is it necessary?

Is it worth it?

Is there a safer alternative?

The Class Concept

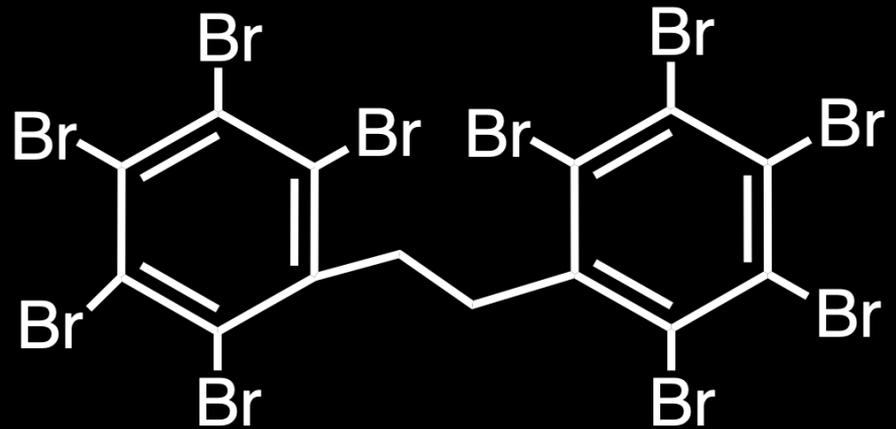
Regrettable Substitution



Decabromodiphenyl
ether

Concerns:

- Persistence
- Bioaccumulation
- Toxicity



Decabromodiphenyl
ethane

Concerns:

- Persistence
- Bioaccumulation
- Toxicity

A large, dense field of multi-colored jelly beans in various colors including red, orange, yellow, green, blue, purple, and pink. The text is overlaid on the center of the image.

**EVALUATING TENS OF THOUSANDS OF
INDIVIDUAL CHEMICALS IS UNWORKABLE**



BUT ADDRESSING **SIX GROUPS** OF
CHEMICALS OF CONCERN IS MANAGEABLE



Six Classes Videos

An innovative approach to reducing toxics

1

Highly
Fluorinated

2

Antimicrobials

3

Flame
Retardants

4

Bisphenols
+ Phthalates

5

Some
Solvents

6

Certain Metals



VIEW and SHARE: www.SixClasses.org

Healthier products, healthier people in four minutes!

Do flame retardants save lives?

Flame Retardants in Furniture Foam: Benefits and Risks

VYTENIS BABRAUSKAS¹, ARLENE BLUM^{2,3}, REBECCA DALEY³, and LINDA BIRNBAUM⁴

¹Fire Science and Technology Inc.

9000 - 300th Place SE, Issaquah WA 98027 USA

²Department of Chemistry

NIST Technical Note 1747

San Antonio Statement on Brominated and Chlorinated Flame Retardants

Article

Joseph DiGangi¹, Arlene Blum^{2,3}, Åke Bergman⁴, Cynthia A. de Wit⁵, Donald Lucas⁶, David Mortimer², Arnold Schechter⁸, Martin Scheringer⁹, Susan D. Shaw¹⁰, Thomas F. Webster¹¹

¹ International POPs Elimination Network, Berkeley, California, USA, ²

Jump to

[Signatories](#)

[Supplemental Mate](#)

Factors Influencing the Smoldering Performance of Polyurethane Foam



BRI BUILDING RESEARCH & INFORMATION (2012) 40(6), 738–755



INFORMATION PAPER

Flame retardants in building insulation: a case for re-evaluating building codes

Vytenis Babrauskas¹, Donald Lucas², David Eisenberg³, Veena Singla⁴, Michel Dedeco⁵ and Arlene Blum^{4,5}

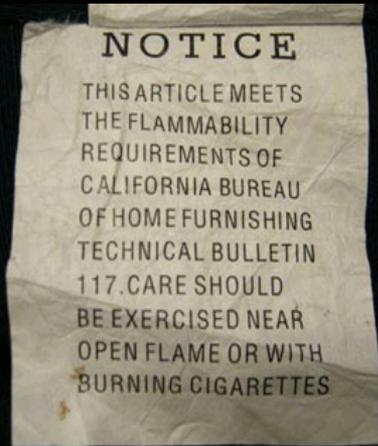
“No significant, consistent difference...”

Flame retardant combustion:

- Smokier fires
- Toxic combustion by-products

Flammability Standards Drive FR Use:

Technical Bulletin 117



Furniture foam to withstand a small open flame for 12 seconds

- Smolder vs. open flame fires—6:1 death ratio
- Slow response in ionizing smoke detectors

ASTM E84

All insulation must pass Steiner tunnel test



- Behind thermal barrier?
- Beneath a concrete foundation?

4 attempts at legislative reform of TB 117....

A DEADLY MISTAKE

DON'T LET THE SACRAMENTO PROVEN FLAME RETARDANTS



TRIBUNE WATCHDOG

Playing with fire

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.

BY PATRICIA CALLAHAN AND SAM ROE
Tribune reporters

Dr. David Heimbach knows how to tell a story. Before California lawmakers last year, the noted burn surgeon drew gasps from the crowd as he described a 7-week-old baby girl who was burned in a fire started by a candle while she lay on a pillow that lacked flame retardant chemicals.

"Now this is a tiny little person, no bigger than my Italian greyhound at home," said Heimbach, gesturing to approximate the baby's size. "Half of her body was severely burned. She ultimately died after about three weeks of pain and misery in the hospital."

Heimbach's passionate testimony about the baby's death made the long-term health concerns about flame retardants voiced by doctors, environmentalists and even firefighters sound abstract and petty.

But there was a problem with his testimony: It wasn't true. Records show there was no dangerous pillow or candle fire. The baby he described didn't exist.

Neither did the 9-week-old patient who Heimbach told California legislators died in a candle fire in 2009. Nor did the 6-week-old patient who he told Alaska lawmakers was fatally burned in her crib in 2010.

Heimbach is not just a prominent burn doctor. He is a star witness for the manufacturers of flame retardants.

His testimony, the Tribune found, is part of a decades-long campaign of deception that has loaded the furniture and electronics in American homes with pounds of toxic chemicals linked to cancer, neurological deficits, developmental problems and impaired fertility.

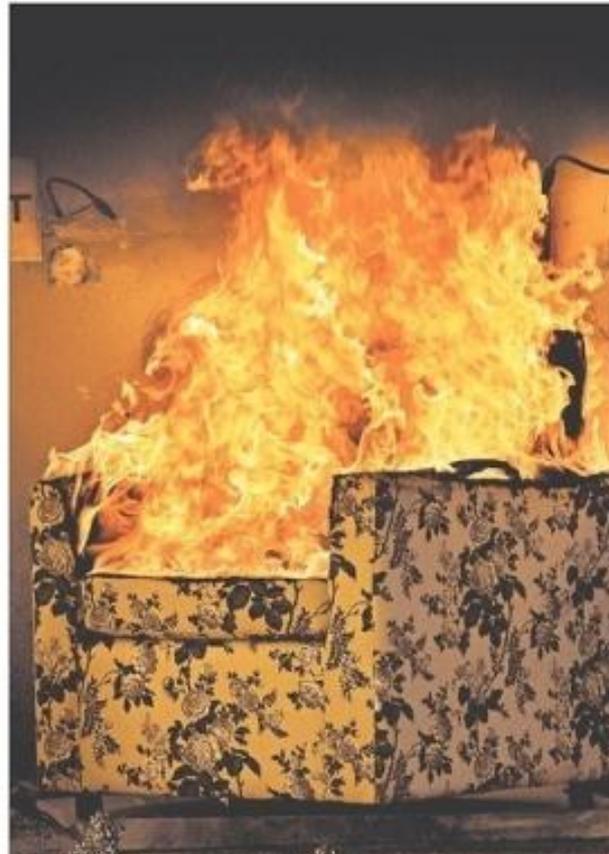
The tactics started with Big Tobacco, which wanted to shift focus away from cigarettes as the cause of fire deaths, and continued as chemical companies worked to preserve a lucrative market for their products, according to a Tribune review of thousands of government, scientific and internal industry

stoked the public's fear of fire and helped organize and steer an association of top fire officials that spent more than a decade campaigning for their cause.

Today, scientists know that some flame retardants escape from household products and settle in dust. That's why toddlers, who play on the floor and put things in their mouths, generally have far higher levels of these chemicals in their bodies than their parents.

Blood levels of certain widely used flame retardants doubled in adults every two to five years between 1970 and 2004. More recent studies show levels haven't declined in the U.S. even though some of the chemicals have been pulled from the market. A typical American baby is born with the highest recorded concentrations of flame retardants among infants in the world.

People might be willing to accept the health risks if the



Code Reform

TB 117-2013: Updated standard

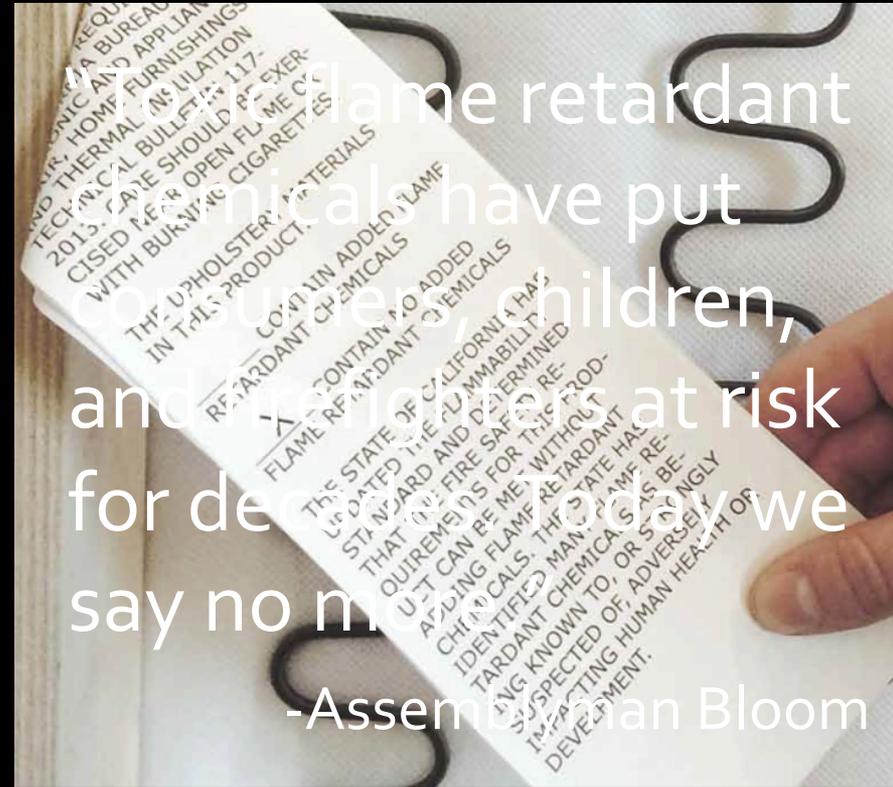
- Greater fire safety, optional FR use
- Reporting on label

TB 133: Open-flame testing of upholstered furniture in high occupancy public spaces

- Repealed January 2019

AB 2889: California Bans Flame Retardants in furniture, children's products & mattress foam

- Signed September 2018



PETITION: U.S. Consumer Product Safety Commission

Products with the **class** of Organohalogen Flame Retardants

GRANTED --2017

Declare as “banned hazardous substances”:

- Children’s products
- Residential furniture
- Mattresses & mattress pads
- Plastic electronics enclosures

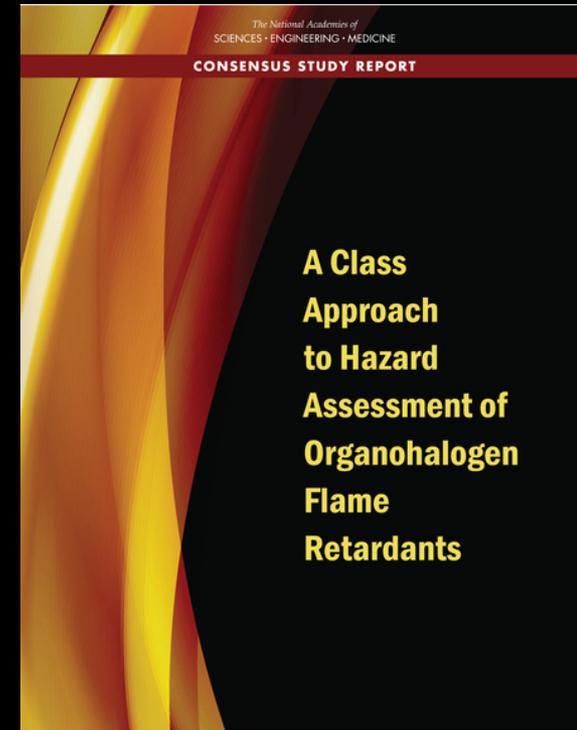


containing additive, non-polymeric organohalogen FRs

PETITION: U.S. Consumer Product Safety Commission

UPDATE: May 15, 2019

- National Academy of Science advisory Committee to Develop Scoping Plan Report
- OFRs can be divided into 14 subclasses subclasses for hazard assessment



“The only possible practical approach for a set of chemicals as large as the OFRs is a class approach.”

Recycling Flame Retarded Plastics

Flame Retardants in Kitchen Utensils

- Black plastic often contains BFRs
- BFRs found in 34% of tested utensils
- Up to 20% of BFRs transferred to cooking oil



EU Ban on Flame Retardants in Electronics Cases

Ecodesign directive bans the **class** of organohalogen flame retardants

- In cases and stands of electronic displays and TVs
- Unanimously approved by 24 member states
- Effective March 2020
- Motivation: plastic recycling in the Circular Economy

EUROPEAN COMMISSION

4. Halogenated flame retardants

The use of halogenated flame retardants is not allowed in the enclosure and stand of electronic displays.

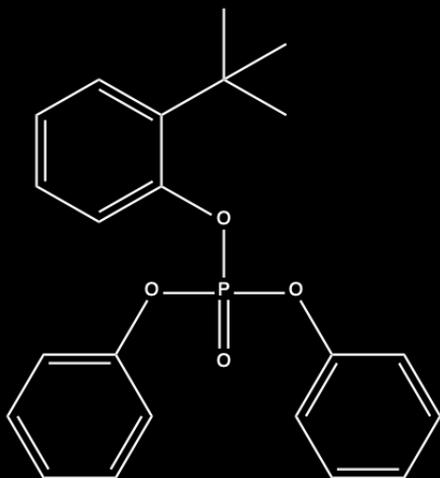
COMMISSION REGULATION (EU) .../...

of **XXX**

laying down ecodesign requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council, amending Commission Regulation (EC) No 1275/2008

Regrettable substitution: Organophosphates

- Organophosphate esters are popular replacements for organohalogen FRs
- OPEs are associated with neurological and skeletal system harm



Tert-Butylphenyl Diphenyl Phosphate (BPDP)

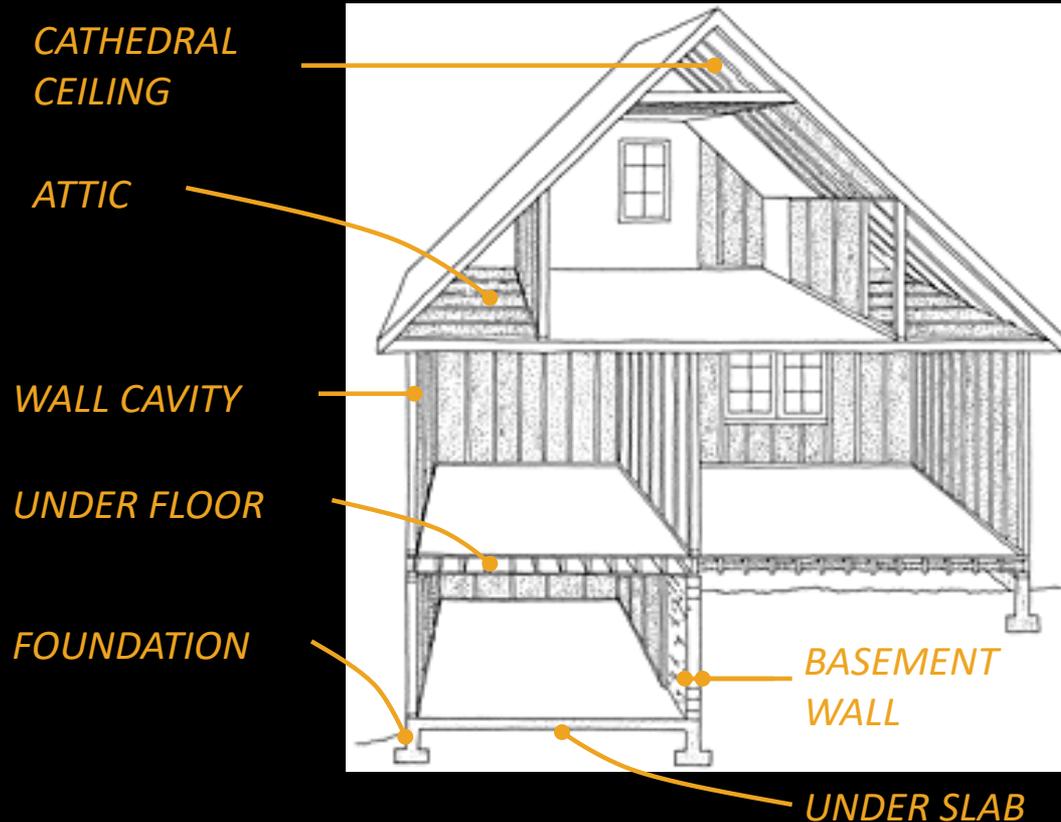
Paradis and Hales, 2015; H. Yan *et al.*, in preparation.



GD15

Cartilage templates (green) failed to properly develop into adult bone cells (blue) after exposure to BPDP.

Flame Retardants in Insulation



Not needed in insulation:

- Below grade
- Behind a thermal barrier

Regrettable Substitution: Polymers

Degradation of Polymeric Brominated Flame Retardants: Development of an Analytical Approach Using PolyFR and UV Irradiation

Christoph Koch,^{*,†,‡,§} Alexander Dundua,^{||} Jackelyn Aragon-Gomez,^{‡,||} Milen Nachev,^{†,‡}
Susanne Stephan,^{‡,⊥} Sarah Willach,^{‡,#} Mathias Ulbricht,^{‡,||} Oliver J. Schmitz,^{‡,⊥} Torsten C. Schmidt,^{‡,#}
and Bernd Sures^{†,‡}

Contents lists available at ScienceDirect

Chemosphere

journal homepage: www.elsevier.com/locate/chemosphere



Degradation of brominated polymeric flame retardants and effects of
generated decomposition products

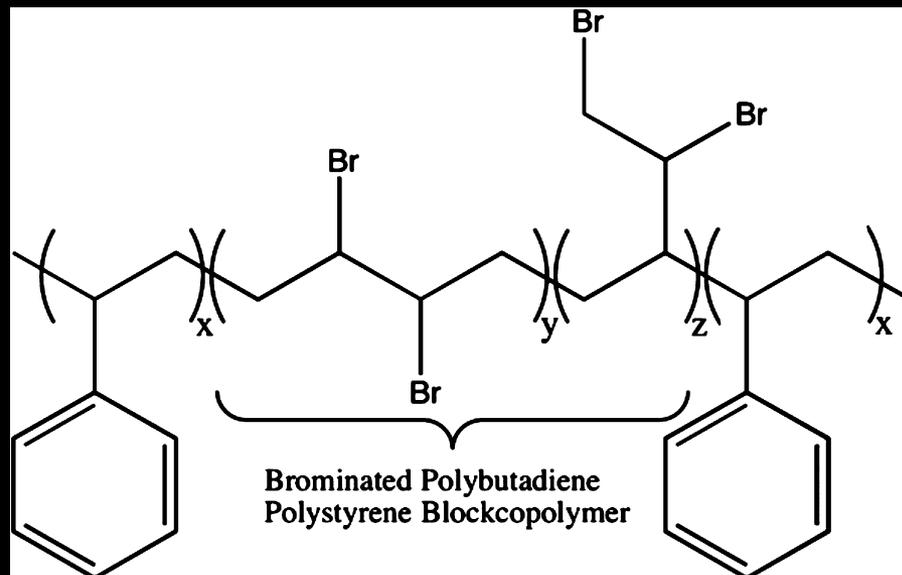
Christoph Koch^{a,b,*}, Bernd Sures^a



PolyFR

Tradenames:

- BLUEDGE
- Emerald Innovation 3000
- GreenCrest



Insulation: Building Code Change

January 2019: California Building Standards Commission unanimously votes to allow flame-retardant free insulation below a concrete slab



May 2019: International Code Council rejects same proposal by vote of 10-1

By radically reimagining how we think about toxic chemicals, we can live in a healthier world.



SixClasses.org

PFASCentral.org

GreenSciencePolicy.org