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### Flame retardants - Part I What are these chemicals?

All families have their own preferences for indoor living, choosing different items for use and comfort, ranging from clothes, to furniture, for various needs. But when a fire breaks out, it can have devastating impacts. One solution created by industries is to add chemicals to delay the flames from spreading through your furniture and other items such as clothing or other materials. However, as a consumer, it is important to question the nature of these chemicals and their impacts. This article will look at the mechanisms of these chemicals and where you may encounter them, particularly in objects that are commonly used for daily living.

Fire is an exothermic process that generates heat energy through the consumption of oxygen and releases energy to its surroundings in the forms of heat and light. To counteract this process, certain industries add chemicals in the manufacture or finishing of their products that prevent them from lighting on fire. These added substances are called flame retardants. Four retardation mechanisms are used for this aim, such as endothermic degradation, which causes the material to cool down when the fire interacts with it, and thermal shielding which creates a sort of insulation barrier between the burnt and unburnt parts.

So, what are these chemicals in practice? The term flame retardants encompass a diverse group of chemicals that are activated by the presence of a fire and are intended to prevent or slow its development and spread. They are separated into several classes of compounds (inorganic, organohalogen, organophosphorus or organic) and can be either reactive (chemically binding to the surrounding system) or additive (without chemical bonds) to their physical carriers.

Typically, these products that flame retardants are used on are goods susceptible





to ignition or manufactured materials, such as most home and office products, clothing, plastics, textiles, surface finishes and coatings. Today, flame retardants are used in five major sectors: electronics and electronic devices, building materials, furniture, clothing, and transportation (vehicle interiors) but it is important to know what other domains these chemicals can be found in as well. These chemicals can escape (especially additives) from treated products and penetrate the skin or accumulate in dust, which children can get on their hands and put in their mouths. Many halogenated flame retardants are also particularly persistent (meaning that they are difficult to destroy and can build up over time in our built and natural environments creating lasting impacts on our health and the health of the environment), bioaccumulative (meaning that they react and accumulate with the organic molecules in their surroundings leading to high quantities of these chemicals that can be found in humans and other living beings) and/or toxic. Many of these substances have been identified by the UN, as well as multiple governments to be banned or at least to reduce their use given their dangerous effects on human and environmental health.

Now that you have a better idea of where these chemicals can be found, it is important that you know the impacts of these substances both on the environment and on your health and how to avoid them. To learn more about this topic, you are invited to consult the following links. Please note that more links will be added in the second part of this topic in the next newsletter.

Online links:

- Dangers of flame retardants chemicals on kids clothing, by The Laundry Guru, in natural living news, Molly's Subs blog, published on December 12<sup>th</sup> 2018, <https://blog.mollyssuds.com/2018/12/12/flame-retardant-chemicals/>
- The harmful chemical lurking in your children's toys, by Lisa Gross, parenting section, The New York Times, published on November 23<sup>rd</sup> 2020, [https://www.nytimes.com/2020/11/23/parenting/home-flame-retardants-dangers.html?ct=t\(RSS\\_EMAIL\\_CAMPAIGN\)&fbclid=IwAR22itDfnCWssez6-xADZ4M54EhSegLxDcHeUAI36wVfk1W9RtxAmxWd0hI](https://www.nytimes.com/2020/11/23/parenting/home-flame-retardants-dangers.html?ct=t(RSS_EMAIL_CAMPAIGN)&fbclid=IwAR22itDfnCWssez6-xADZ4M54EhSegLxDcHeUAI36wVfk1W9RtxAmxWd0hI)
- Flame retardants overview, American Chemistry Council, copyright in 2021, <https://flameretardants.americanchemistry.com/>



- Toxic chemistry: halogenated flame retardants, Greenspec, copyright in 2021, <https://www.greenspec.co.uk/building-design/halogenated-flame-retardants-environment-health/>
- Exothermic process, Wikipedia, the free encyclopedia, last modification made on July 17<sup>rd</sup> 2021, [https://en.wikipedia.org/wiki/Exothermic\\_process](https://en.wikipedia.org/wiki/Exothermic_process)
- Flame retardants, Wikipedia, the free encyclopedia, last modification made on July 24<sup>th</sup> 2021, [https://en.wikipedia.org/wiki/Flame\\_retardant](https://en.wikipedia.org/wiki/Flame_retardant)