PFAS EDUCATION

PART 1:
COOKWARE, PFAS, AND PTFE

The CBA is a not-for-profit trade association owned by its membership: manufacturers of cookware, bakeware and kitchenware with substantial operations and headquarters in the United States. The CBA began in the early 1920s as the Aluminum Wares Association, became the Metal Cookware Manufacturers Association in the 1960s, and in the 1970s changed its name to the Cookware Manufacturers Association in recognition of its representation of all types of cookware and bakeware materials. The CBA's mission is to inform and promote the industry to its members, their customers and to the general public.

The members of The Cookware & Bakeware Alliance (CBA) develop standards to promote the welfare of the cookware industry and improve its service to the public. The CBA Engineering Standards are continually updated to reflect changes in materials and technology and include test methods for nonstick finishes on cookware that when followed ensure coating performance and durability.

Nonstick cookware and bakeware manufactured according to CBA Standards use only US FDA food contact compliant materials for surfaces. CBA supports the responsible manufacturing and safe uses of PTFE and other fluoropolymers, and a science-based approach to regulations that benefit human health and the environment. CBA supports labeling provisions to alert consumers to the presence of PFAS, but based on current science, considers it unnecessary to prohibit sales and eliminate consumer choice.

Your cookware and bakeware industry resource.

Knowledge is powerful. This is a key element in why The Cookware & Bakeware Alliance was formed back in 1922, to collect and share important information and create safe consumer products.

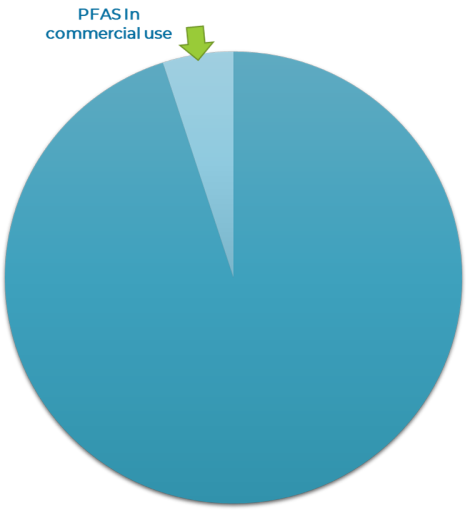
For years we have answered questions and shared resources on important topics facing our industry. Many times, only part of the answer is shared, or one viewpoint. The Good Science site has been created to help provide resources and access to more information on important topics. We now bring all of this information to our website to share and promote Good Science. Visit the Good Science webpage to explore.

For questions, please contact Fran Groesbeck, Managing Director (fran@cookware.org).

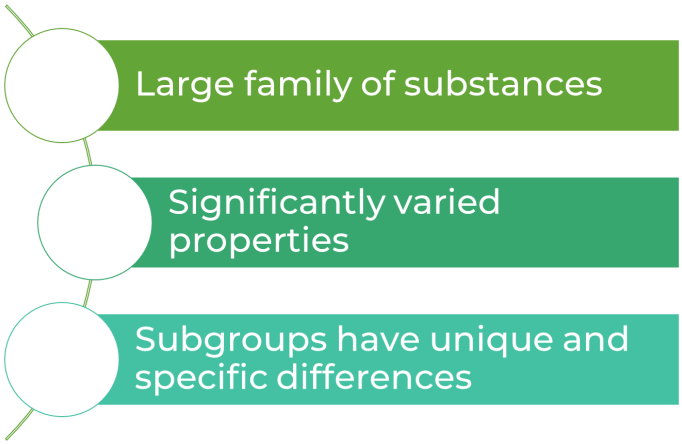
Thank you for your interest in Good Science!

PART 1: Cookware, PFAS, and PTFE

Per- and polyfluoroalkyl substances (PFAS) are a diverse group of chemistries that contain carbon-fluorine bonds, the strongest chemical bonds in organic chemistry. Due to their unique and useful properties, PFAS are widely used and critical to enabling numerous technologies.



The term PFAS encompasses in some instances as many as 12,000+ substances. However, it is estimated that roughly 5% of all PFAS substances are in commercial use today. Further, not all PFAS are the same. The chemistries currently in commercial use have very different physical and chemical properties, health, and environmental profiles, uses, and benefits.

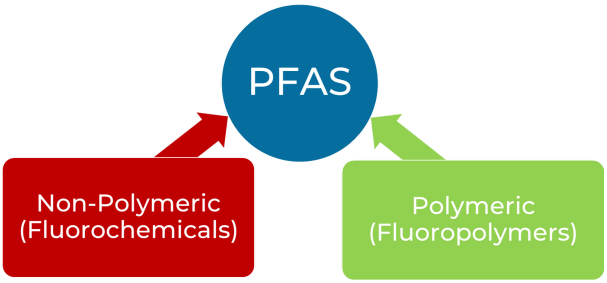


They can be considered part of a universe of fluorinated organic substances with varying physical, chemical, and biological properties including polymers and non-polymers; solids, liquids, and gases.[1]

A subgroup of PFAS having specific characteristics and properties is called fluoropolymers. The discovery of the first fluoropolymer, polytetrafluoroethylene (PTFE), occurred in 1938 [2], and it led to its use in the most critical and demanding applications known. Aerospace and military applications were first to use fluoropolymers to insulate cables or create impermeable seals because it can withstand the harshest conditions and it replaces materials that have a high risk of failure due to a deterioration of properties. Uses in conditions where other materials fail due to corrosion and extreme temperature are the hallmark of fluoropolymers, often making them irreplaceable.

The first nonstick cookware appeared in the US in 1961.[3] Fluoropolymers are used in cookware, for their non-stick and barrier properties. To ensure food contact substances are safe for their intended use, the FDA conducts a rigorous scientific review before they are authorized for the market.[4]

PFAS can be divided into two distinct groups: non-polymeric and polymeric PFAS. Furthermore, the non-polymeric, ie fluorochemicals, are water soluble, versus the polymeric, ie fluoropolymers, are not.



The non-polymeric PFAS (fluorochemicals) are typically used for food contact materials (FCM), such as fast-food packaging and microwave popcorn bags, as well as a number of other applications and industries. The FCM examples referenced can indirectly contribute to dietary exposure through the migration of PFAS into food, which can be a food safety concern [5]. Because they are water soluble, consumers have the potential to be exposed through foods and/or drinking water.

Whereas the polymeric PFAS (fluoropolymers), such as PTFE, which are used in nonstick cookware and bakeware coatings, are not water soluble, and have documented safety profiles. They are thermally, biologically, and chemically stable. They are also nonmobile, non bioavailable, non bioaccumulative, nontoxic, and most importantly they are not soluble in water. Although fluoropolymers fit the current PFAS structural definition, they have very different physical, chemical, environmental, and toxicological properties when compared with other PFAS.[6]

Fluorochemicals	Characteristic	Fluoropolymer *(used in cookware)*
Yes	Water Soluble	No
Yes	PFAS of Concern	No
Yes	Transported in Air	No
Yes	Toxicity	No
Yes	Persistence/ Non-Degradable	Yes

[1] Identification and classification of commercially relevant per- and poly-fluoroalkyl substances (PFAS) Robert C. Buck,Stephen H. Korzeniowski,Evan Laganis,Frank Adamsky; First published: 14 May 2021 https://doi.org/10.1002/ieam.4450

[2] https://www.aps.org/publications/apsnews/202104/history.cfm

[3] ibid

[4] Authorized Uses of PFAS in Food Contact Applications https://www.fda.gov/food/chemical-contaminants-food/authorized-uses-pfas-food-contact-applications

[5] Schaider, L.A.; Balan, S.A.; Blum, A.; Andrews, D.Q.; Strynar, M.J.; Dickinson, M.E.; Lunderberg, D.M.; Lang, J.R.; Peaslee, G.F. Fluorinated Compounds in U.S. Fast Food Packaging. Environ. Sci. Technol. Lett. 2017. [CrossRef] [PubMed] https://www.mdpi.com/2304-8158/10/7/1443

[6] A critical review of the application of polymer of low concern regulatory criteria to fluoropolymers II: Fluoroplastics and Fluoroelastomers. Stephen H. Korzeniowski,Robert C. Buck,Robin M. Newkold,Ahmed El kassmi,Evan Laganis,Yasuhiko Matsuoka,Bertrand Dinelli,Severine Beauchet,Frank Adamsky

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THE COOKWARE & BAKEWARE ALLIANCE
Supplying the Industry with Standards, Connections & Solutions.

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