

PFAS - Hazard Assessment Framework

PFAS encompass a broad range of chemicals with varying properties and toxicities.

Introduction

PFAS (Per- and Polyfluoroalkyl Substances) are a large and diverse group of chemicals that have different properties and toxicities. There is no definitive ranking of PFAS by their degree of toxicity, as different PFAS may have different effects on different organs and systems in the body and environment.

However, a general trend can be observed referring to the resources provided by the Agency for Toxic Substances and Disease Registry (ATSDR):

Long-chain PFAS (those with eight or more carbon atoms in the main chain) tend to be more persistent, bioaccumulative and toxic than short-chain PFAS.

Toxicity Variations in PFAS

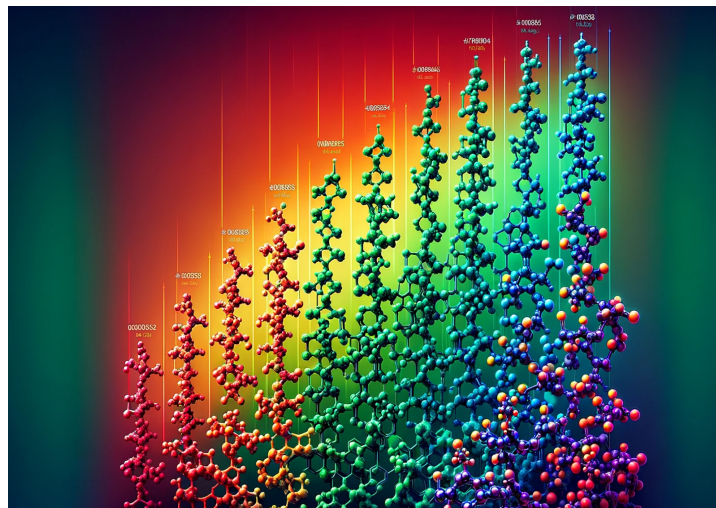
PFAS can vary in toxicity, and here is a list of some common PFAS chemicals arranged by their general degree of toxicity from higher to lower:

Highly Toxic PFAS

- **Perfluorooctanoic Acid (PFOA)** is a well-known PFAS compound that has been associated with adverse health effects, including developmental issues, cancer, and liver problems.
- **Perfluorooctanesulfonic Acid (PFOS)** has been linked to serious health concerns and is a highly toxic PFAS.

Moderately Toxic PFAS

- **Perfluorohexanesulfonic Acid (PFHxS)** is another PFAS chemical with potential health risks, although it is generally considered to be less toxic than PFOA and PFOS.



Low Toxic PFAS

- **Perfluoroalkyl Ether Acids (PFEAs)**. Some are less toxic than PFOA and PFOS, but they may still have health and environmental concerns associated with them.
- **Perfluorobutanesulfonic Acid (PFBS)** is generally considered to have lower toxicity compared to PFOA and PFOS.
- **Perfluoropentanoic Acid (PFPeA)** is another PFAS compound with lower toxicity relative to PFOA and PFOS.
- **Perfluorohexanoic Acid (PFHxA)** is a shorter-chain PFAS that tends to have lower toxicity than the longer-chain ones.

Lowest Toxic PFAS (still a subject of research)

- **Polytetrafluoroethylene (PTFE)** is often considered low in toxicity when it is in its solid form, such as in non-stick cookware. However, certain fumes produced when PTFE is heated can be harmful if inhaled, and there is ongoing research regarding its safety.
- **Perfluoroalkyl Ammonium Compounds (PFAAs)**. Some may have lower toxicity compared to other PFAS, but their specific toxicity can vary.
- **Perfluoroalkoxy (PFA)** is generally considered to be a lower-risk PFAS because of its stability and low reactivity under typical conditions.
- **Fluoroelastomer (FKM)** is a synthetic rubber often used for sealing applications and is generally considered a

lower-risk PFAS.

- **Ethylene Chlorotrifluoroethylene (ECTFE)** is a polymer with relatively low toxicity and is used in various industrial applications.

Fluoropolymers in Industry

Fluoropolymers used on the products of InterApp like PTFE, ETFE, FEP, PFA, and PVDF have been classified as “low concern polymers” in some studies due to their high chemical stability, non-toxicity, lack of bioaccumulation, insolubility in water, and limited mobility.

Environmental and Health Impact

An analysis published in the journal Environmental Science & Technology assessed the environmental and human health impact of fluoropolymers throughout their lifecycle.

The study highlights that the production and use of certain fluoropolymers are associated with the emission of other PFAS (per- and polyfluoroalkyl substances) during their processing and end-of-life treatment.

Additionally, concerns exist regarding the safe disposal of fluoropolymers and their associated products.

Safe Handling and Regulations

Please note that the classification of these materials is a general guideline and can vary depending on specific circumstances, such as exposure levels and environmental conditions. Always follow safety guidelines and regulatory requirements when working with these materials.



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