PFOS Briefing

Background

Perfluorooctane sulfonate acid (PFOS) is a man-made fluorosurfactant and pollutant. It is formed through industrial production and the degradation of precursors.

Studies indicate that the PFOS levels detected in wildlife are considered high enough to affect health parameters. It was added to Annex B of the Stockholm Convention on Persistent Organic Pollutants in May 2009.

History

Organofluorine content has been detected in the blood serum of consumers, and it was suggested to originate from PFOA or a related compound such as PFOS.

As a result, the primary American producer of PFOS announced in May of 2000, that they would begin to phaseout production of PFOS, PFOA, and PFOS-related products.

PFOS-related chemicals are currently produced in China.

Analytical chemistry studies in recent years have displayed the routine detection of low- and sub-ppb levels of PFOS in food, wildlife, and humans.

Properties

The C8F17 subunit of PFOS is hydrophobic and lipophobic, while the sulfonic acid/sulfonate group adds polarity.

PFOS is a stable compound in industrial applications and in the environment because of the effect of aggregate carbon–fluorine bonds.

PFOS Uses

- sodium or potassium salts
- the key ingredient in Scotchgard, a fabric protector, and stain repellent
- aqueous film forming foam, a component of fire-fighting foams and alcohol-type concentrate foams
- some impregnation agents for textiles, paper, and leather;
- wax, polishes, paints, varnishes and cleaning products for general use
- metal surfaces, and carpets
- in multiple photolithographic chemicals including photoacid generators and anti-reflective coatings

Risk to humans and wildlife

PFOS has been shown to affect the immune system of male mice at a blood serum concentration of ~90 parts per billion, raising the possibility that highly exposed people and wildlife are immune systems are compromised.

In animal studies PFOS also causes cancer, physical development delays, endocrine disruption, and neonatal mortality; PFOS reduces the birth size of animals.

Blood levels of PFOS appear to be rising in China. PFOS levels in pregnant women have been associated with preeclampsia. Levels have also been associated with altered thyroid hormone values and an increased risk of high cholesterol.

Current Regulatory Status

In May 2009 PFOS was included in Annex B of the Stockholm Convention on persistent organic pollutants by the Fourth Conference of Parties.

Canada has a proposed ban on PFOS, only the second chemical proposed for a complete ban under the Canadian Environmental Protection Act.

The use of PFOS is restricted in Europe.