

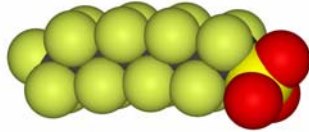
Obstacles In Risk Management On PFOS In China

Yao Wei
China

Contents

- 1 Background
- 2 Obstacles Analysis
- 3 Solution Discussion
- 4 Further Consideration

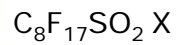
Background---Definition of PFOS



PFOS
 Molecular formula: $C_8F_{17}SO_3$
 CAS number: None

PFOS-related compounds:

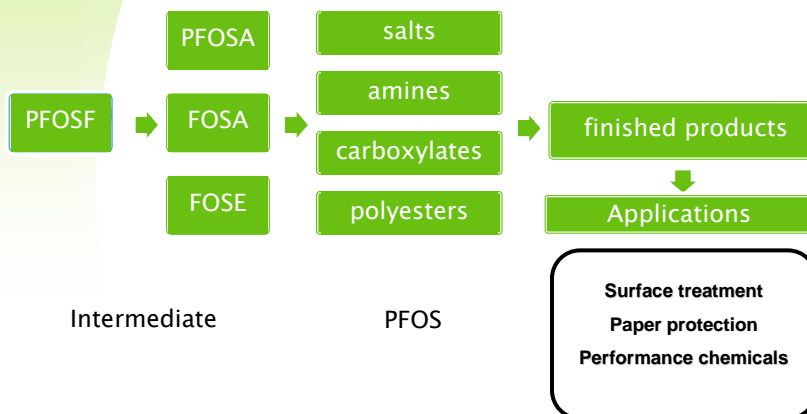
members of a large family of anthropogenic chemicals that all are derivatives of and can degrade to PFOS.



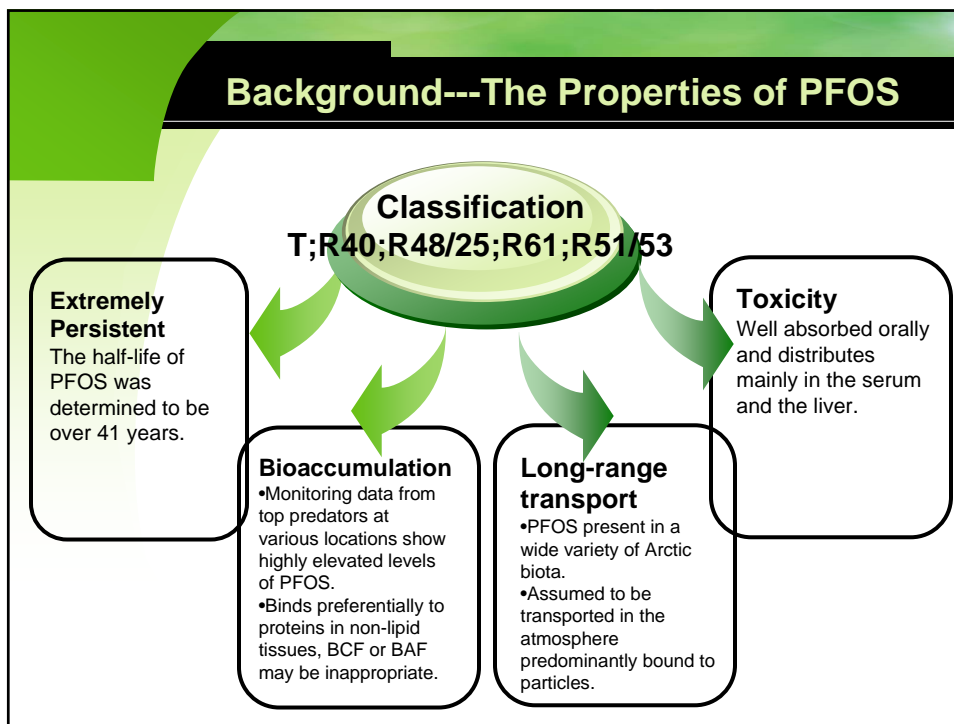
(X = OH, Metal salt (O-M⁺), halide, amide, and other derivatives including polymers)

Background---The Production Flow and Application of PFOS

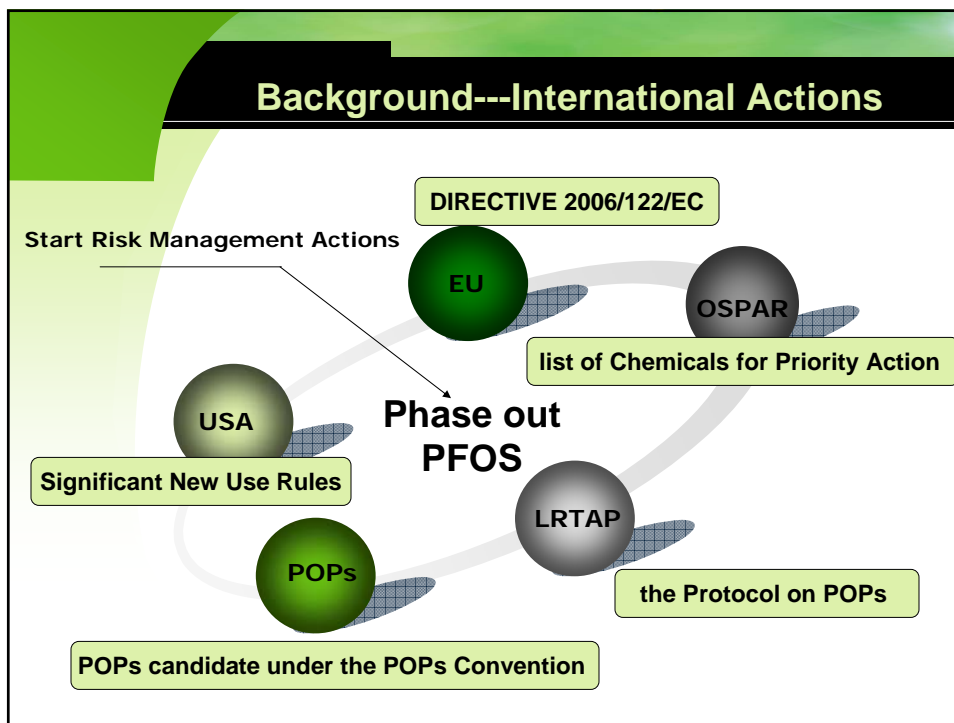
Direct fluorination, electro-chemical fluorination (ECF):
 $C_8H_{17}SO_2Cl + 18 HF \rightarrow C_8F_{17}SO_2F + HCl + \text{by products}$



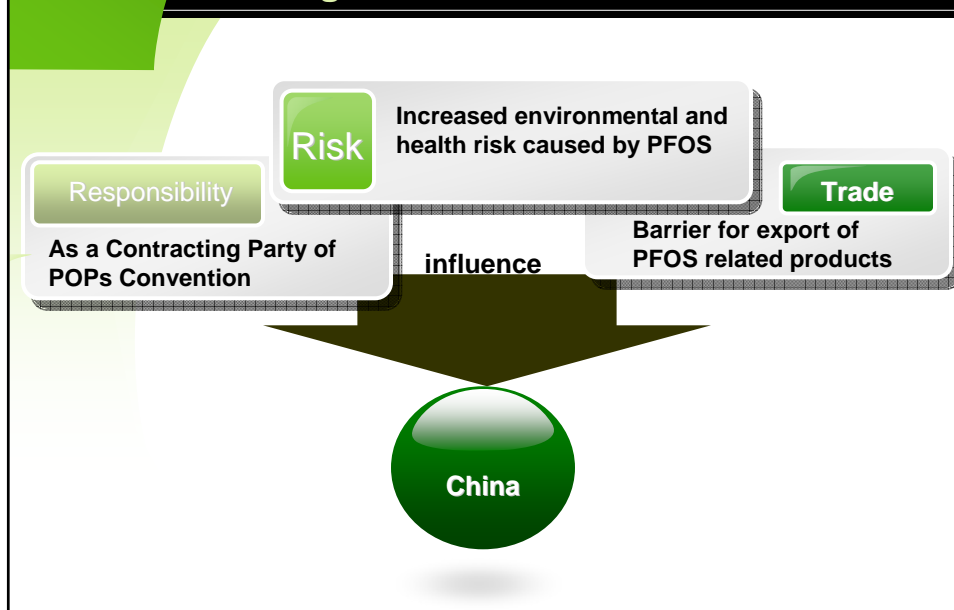
Background---The Properties of PFOS



Background---International Actions

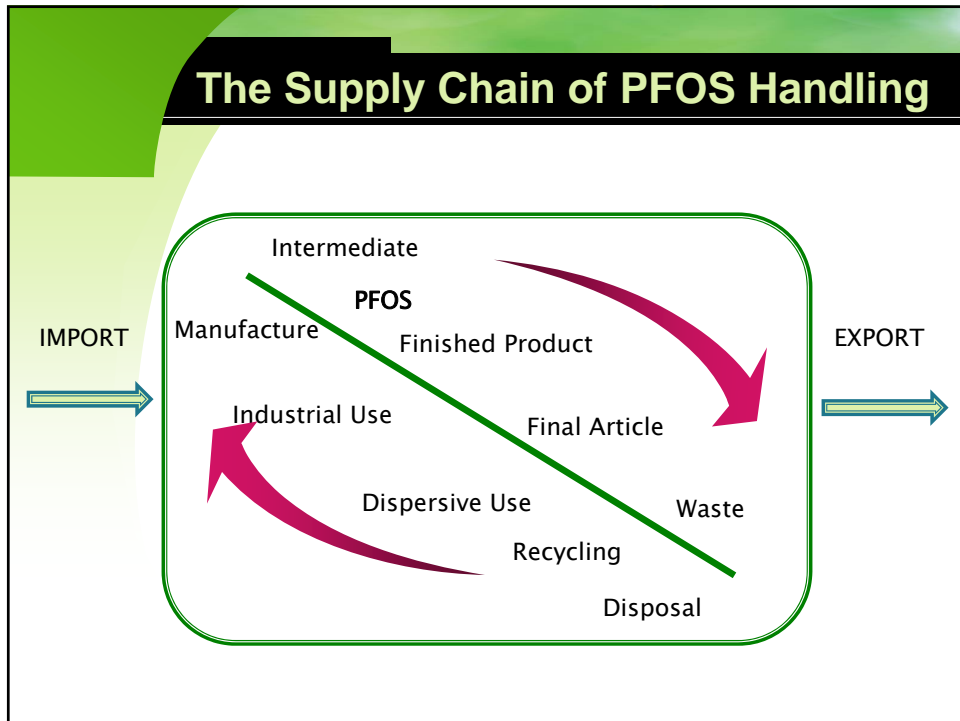


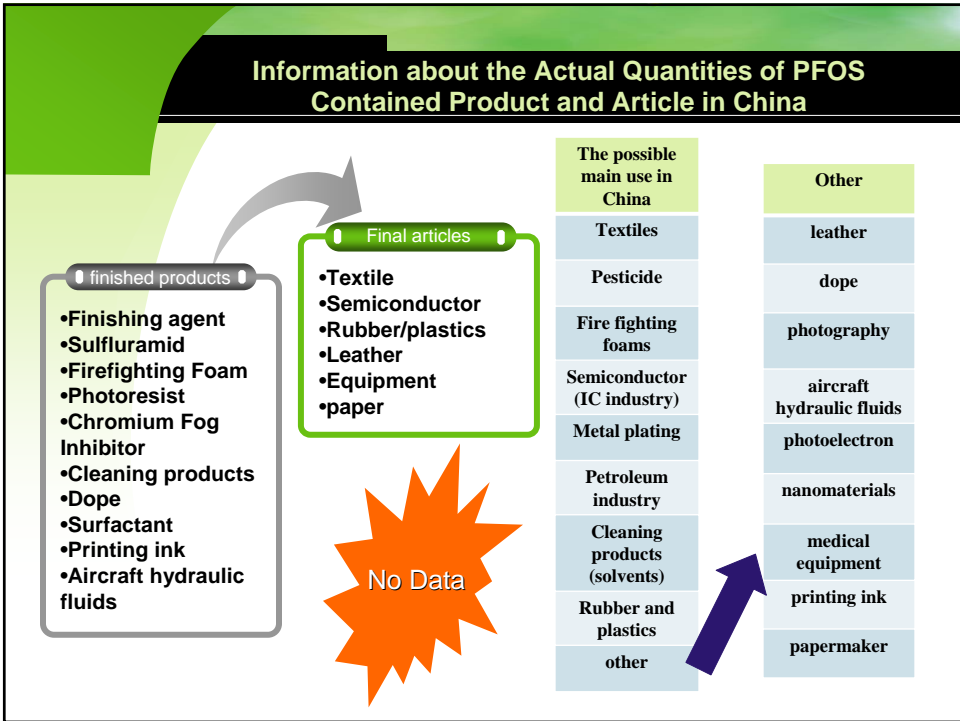
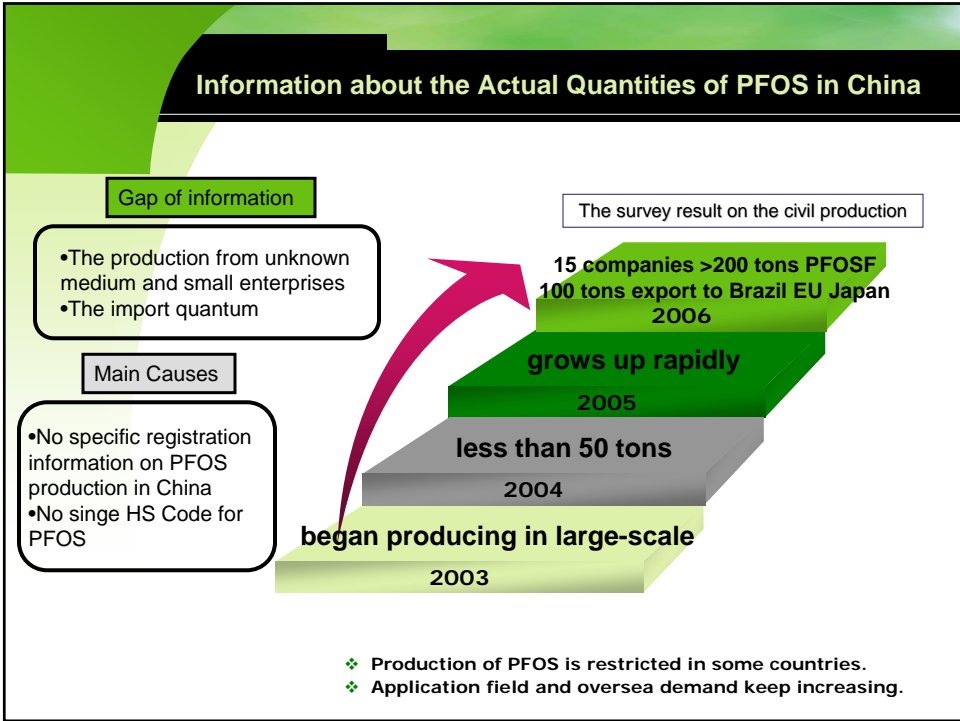
Background---The Influence on China



Risk Management: Objective VS Foundation

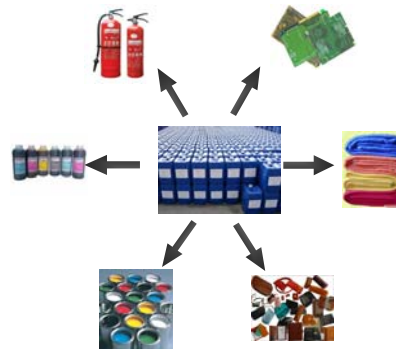






Information about the Actual Quantities of PFOS Contained Product and Article in China

- The use of PFOS is widespread and complicated, and there are still unidentified application fields unknown.
- In the known application categories, not all the products and articles contains PFOS.
- There are a variety of brand goods which may contain PFOS without marking the content of PFOS in the label or instruction manual, some of which only state their composition as fluorinated chemicals but not specify PFOS or not.
- We only know the information about the main civil producers of PFOS and have little information about downstream producer and users in much larger amount.
- Most possible PFOS contained products used by Chinese industries and many possible PFOS contained articles are imported without information about the content of PFOS. And it is much more difficult to collect the information about the producer overseas.
- PFOS is most used as additive and exists at a trace amounts, which means high instrument requirements and expensive Laboratory testing fee.



Information about the Actual Quantities Released into Environment



PFOS can be released to environment:

- Along with the waste water, waste gas and waste material during the producing process
- Along with the products during the using process
- Escape from the products and articles during their lifecycle
- Along with the waste products and articles during the disposal process

Little information about the actual quantities released into environment:

- The emission scenes are various and complicated.
- The emission factors are lack with weak research and monitoring data basis.

Information about the Actual Quantities Existed in Environment and Biota

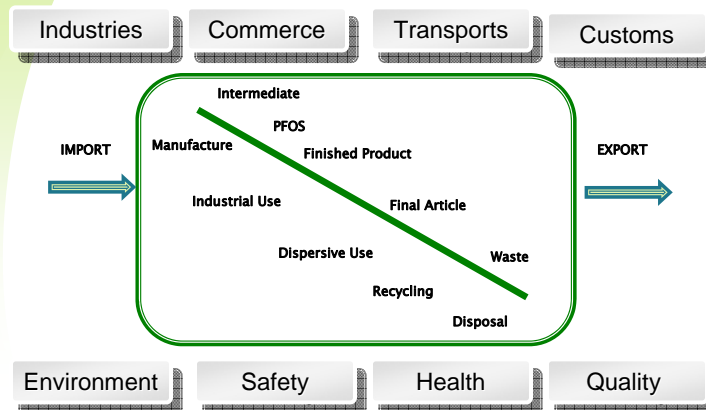
•The monitor of PFOS is just underway and the data is only limited in the research papers.

•There are few research about the PFOS concentration in the air and soil and most about the water including surface water, ground water, tap water and coastal seawater.

•The researches on PFOS in biota are scanty, most about the concentration in serum and breast milk of human, serum of panda, mussel, fish, shrimp, seashell, crab and other aquatic biota.

sample	concentration	reference
surface water	0.2-44.6ng/L	Jin et al. (2004, 2006)
groundwater	0.32-3.96ng/L	Jin et al. (2004, 2006)
tap water	0.4-1.62ng/L	Jin et al. (2004, 2006)
coastal seawater	0.008-9.68ng/L	Nobuyoshi et al., 2005
serum of human	<0.01-145.4ug/L	Jin et al. (03, 04, 06)
serum of panda	0.76-72.80ug/L	Dai et al. (2006)
breast milk	0.45-0.36ug/L	So et al. (2007)
mussel	0.1136-0.3521ng/g (wet weight)	So et al. (2006)
aquatic biota	0.33-13.9ng/g (wet weight)	Gulkowska et al. 2006

Government Departments Related to the Supply Chain of PFOS Handling



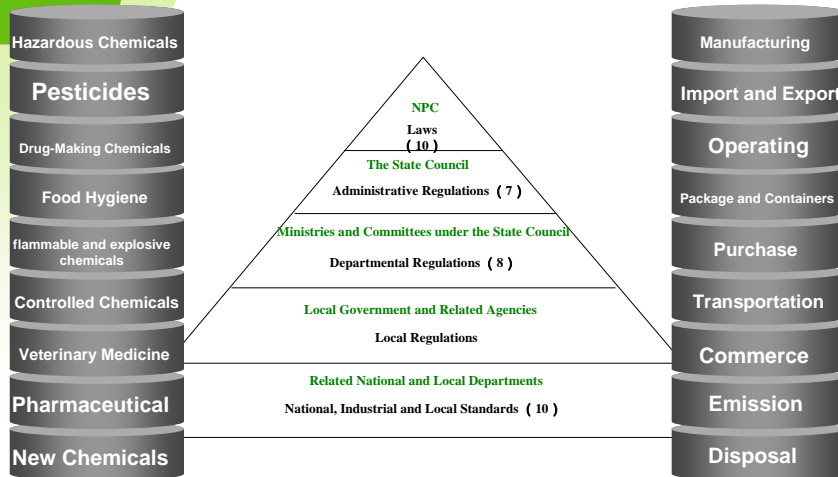
Government Departments Related to Chemicals Management and Their Responsibilities

- ❖ National Development and Reform Commission (adjustment of industry structure)
- ❖ Ministry of Industry and Information Technology (management of industries)
- ❖ Ministry of Public Security (management of hypertoxic chemicals, firefighting)
- ❖ Ministry of Human Resources and Social Security (management of occupational health and accident response)
- ❖ Ministry of Environmental Protection (management of Environmental safety, management of new chemical, import/export of toxic chemicals, obsolete chemicals, environmental monitoring of chemicals)
- ❖ Ministry of Transport (management of road transport, water transport and transport qualification)
- ❖ Ministry of Railways (management of railway transport)
- ❖ Ministry of Agriculture (management of pesticides, veterinary medicines and fertilizers)
- ❖ Ministry of Commerce (management of commerce)
- ❖ Ministry of Health (prevention and control of occupational disease)
- ❖ General Administration of Customs (management of entry and exit of imported and exported chemicals)
- ❖ State Administration for Industry and Commerce (management of Business License)
- ❖ General Administration of Quality supervision, inspection and Quarantine (management of product quality)
- ❖ State Administration of Work Safety (Management of hazardous chemicals)
- ❖ Civil Aviation Administration of China (management of air transport)
- ❖ State Food and Drug Administration (management of food and medicines)

The Insufficiency of Inspection and Supervision Capacity

- ❖ The toxicity and harms of PFOS have not been fully recognized which cause low-level attention in stakeholders.
- ❖ Related tens of governments and industries involve in the PFOS issues which cause heavy coordinating work.
- ❖ Most supervisors are lack of related knowledge and experience facing the new issue.
- ❖ Most institutes have insufficient human resource, technology and equipment, and relevant funding.

System of Laws and Regulations of the Management of Chemicals



The Vacancy of Legislation Basis

- ❖ The existing laws and regulations don't require management on PFOS and PFOS doesn't belong to any chemical management list.
- ❖ There are no standards for testing, emission control, product quality, identification of hazardous waste and so on.
- ❖ Few successful experience can be learned how to management chemicals in articles during supply chain combined with existing tens of laws and regulations.

The Existing Alternatives

- ❖ Other highly fluorinated compounds like fluorotelomers and fluorotelomer-based substances, PFBS, fluorinated polyethers, C4-polyfluorinated compounds, C6-polyfluorinated compounds and so on
- ❖ Fluorine-free alternatives like silicone based products, Hydrocarbon surfactants, protein-based foams and so on

The Lack of Substitute and Alternative Technologies

- ❖ No substitutes for certain uses in photolithography processes, in photographic coatings, in metal plating and so on.
- ❖ Lack of effective and economical substitutes for other main uses in textiles, in firefighting foam, in cleaning products and so on.
- ❖ Lack of evidence for some substitutes without unacceptable risk, especially some contains PFOA which may have the similar risk as PFOS.
- ❖ PFOS contained firefighting foam is the substitute of Halon and Sulfluramid is the substitute of Mirex, so it's difficult for industries to change the technique and product in short time.

Suggestion on Information Collecting

Strengthen information dialogue and establish information share platform and mechanism between producers and downstream users, importers and exporters, and related governments.

Promote research on the emission scene and factor, environmental concentration, and environment and health risk assessment to support policy decision.

Request the producer to mark the information of PFOS along with their products and inform their downstream uses and public.

Test typical products and articles to assist compiling using list.

Suggestion on Capacity Building

Promote research, propaganda and training to increase the stakeholders' awareness and knowledge.

Enhance the inter-departmental coordination mechanism.

Increase the human resource, technology and equipment, and relevant funding on main institute.

Suggestion on Legislation Establishment

Readjust industrial structure to gradually restrict the production and usage and reduce the emission of PFOS.

Add PFOS in the related chemical management lists and revise existing legislation.

Establish PFOS emission list and the BAT/BEP guideline to control the PFOS emission.

Stipulate product quality standard to regulate the application areas and restrict the concentration of PFOS in products.

Suggestion on Substitute and Alternative Technology

Promote evaluating the risk and economic efficiency of existing substitutes and developing new substitutes.

Promote the technology transfer and independently developed products to reduce the cost of substitute and alternative technology.

Popularize the effective and economic substitute and alternative technology in industries with integrated policy and economic measures.

Further Consideration on Management of Chemicals in Articles

- ❖ The awareness of article as pollutant pathway need be increased for the government, industry and public. The environment and health risk bring by chemicals in articles needs be recognized based on more research results.
- ❖ The information of chemicals in articles in the supply chain is so numerous and complicated that we need to analysis the information requirements and establish the information collection and sharing mechanism.
- ❖ The policy mechanism of chemicals in articles need be strengthened in both regulatory and voluntary approaches along with more finance and technology support.



Thank You !