

## 国内外水体及底泥中PFOS 污染物污染状况

孙瑞, 吴明红, 徐刚, 刘宁

上海大学 环境与化学工程学院, 上海200444

## Pollution of PFOS in Domestic and International Water and Sediment

SUN Rui, WU Ming-hong, XU Gang, LIU Ning

School of Environmental and Chemical Engineering, Shanghai University, Shanghai 200444, China

- [摘要](#)
- [参考文献](#)
- [相关文章](#)

Download: [PDF \(655KB\)](#) [HTML \(1KB\)](#) Export: [BibTeX](#) or [EndNote \(RIS\)](#) [Supporting Info](#)

**摘要** 全氟辛烷磺酸(perfluorooctane sulphonate, PFOS) 类物质是随人类活动而出现的新型持久性有机污染物, 其污染在世界各地均有检出. PFOS 由含氟污水厂排放污水、工业生产PFOS 物质或前体、大气沉降等方式进入环境中, 主要分布于水体以及底泥中. 水体中PFOS 污染主要发生在人口密集、工业发达区域以及污水处理厂周边. 底泥中PFOS的吸附量影响因素有pH值、阴阳离子表面活性剂及盐浓度. 通过调研现阶段国内外有关PFOS的文献, 综述PFOS 在水体及底泥环境中的污染特性.

**关键词:** 全氟辛烷磺酸类物质(perfluorooctane sulphonate, PFOS) 水体 底泥 污染特性

**Abstract:** Perfluorooctane sulphonate (PFOS) is a new type of persistent organic contaminants caused by human living and detected throughout the world. PFOS enters into the environment through fluorine- containing wastewater treatment plant discharges, industrial production of PFOS or its precursors, atmospheric deposition, etc. It is mainly distributed in water and sediments. The PFOS contamination occurs mainly in densely populated and industrialized regions, and areas surrounded water treatment plants. The adsorption of PFOS is affected by pH, cation or anion surfactants, and concentration of salts. This paper analyzes recent domestic and international literature and studies PFOS to give a summary of PFOS pollution characteristics in water and sediment environments.

**Keywords:** perfluorooctane sulphonate (PFOS), water, sediment, pollution characteristics

收稿日期: 2013-04-19;

基金资助:

国家自然科学基金资助项目(11025526, 31100376, 11175112)

通讯作者 吴明红(1968—), 女, 教授, 博士生导师, 博士, 研究方向为污染物检测分析和治理与新兴材料制备. E-mail: mhwu@staff.shu.edu.cn Email: mhwu@staff.shu.edu.cn

作者简介: 吴明红(1968—), 女, 教授, 博士生导师, 博士, 研究方向为污染物检测分析和治理与新兴材料制备. E-mail: mhwu@staff.shu.edu.cn

引用本文:

.国内外水体及底泥中PFOS 污染物污染状况[J] 上海大学学报(自然科学版), 2013,V13(5): 454-458

.Pollution of PFOS in Domestic and International Water and Sediment[J] J.Shanghai University (Natural Science Edition), 2013,V13(5): 454-458

链接本文:

<http://www.journal.shu.edu.cn//CN/10.3969/j.issn.1007-2861.2013.05.003> 或 <http://www.journal.shu.edu.cn//CN/Y2013/V13/I5/454>













- [1] Li F, Zhang C, Qu Y, et al. Quantitative characterization of short- and long-chain perfluorinated acids in solid matrices in Shanghai, China [J]. Science of the Total Environment, 2010, 408: 617-623.
- [2] Zhang L, Liu J, Hu J, et al. The inventory of sources, environmental releases and risk assessment for perfluorooctane sulfonate in China [J]. Environmental Pollution, 2012, 165: 193-198.

## Service

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [Email Alert](#)
- ▶ [RSS](#)

## 作者相关文章

- [5] Thompson J, Roach A, Eaglesham G, et al. Perfluorinated alkyl acids in water, sediment and wildlife from Sydney Harbour [J]. Marine Pollution Bulletin, 2011, 62: 2869-2875.
- [6] Wang T, Wang Y, Liao C, et al. Perspectives on the inclusion of perfluorooctane sulfonate into the Stockholm convention on persistent organic pollutants [J]. Environ Sci Technol, 2009, 43: 5171-5175.
- [7] Xie S, Wang T, Liu S, et al. Industrial source identification and emission estimation of perfluorooctane sulfonate in China [J]. Environment International, 2012, 38: 1-8.
- [8] Llorca M, Farr e M, Pic o Y, et al. Analysis of perfluoroalkyl substances in waters from Germany and Spain [J]. Science of the Total Environment, 2012, 438: 139-150.
- [9] 李法松, 何娜, 覃雪波, 等. 全氟化合物在天津大黄堡湿地多介质分布研究[J]. 环境化学, 2011, 30(3): 638-643.
- [10] 梅胜放. 我国PFOS/PFOA 的生产、应用以及国内外标准现状[J]. 有机氯工业, 2008, 1(1): 21-25.
- [11] Paul G A, Scheringer M, Hungerb uhler K, et al. Estimating the aquatic emissions and fate of perfluorooctane sulfonate (PFOS) into the river Rhine [J]. Journal of Environmental Monitoring, 2012, 14: 524-530.
- [12] Zhang Y, Meng W, Guo C, et al. Determination and partitioning behavior of perfluoroalkyl carboxylic acids and perfluorooctane sulfonate in water and sediment from Dianchi Lake, China [J]. Chemosphere, 2012, 88: 1292-1299. [crossref](#)
- [13] Shi Y, Pan Y, Wang J, et al. Distribution of perfluorinated compounds in water, sediment, biota and floating plants in Baiyangdian Lake, China [J]. Journal of Environmental Monitoring, 2012, 14: 636-642.
- [14] Yu N, Shi W, Zhang B, et al. Occurrence of perfluoroalkyl acids including perfluorooctane sulfonate isomers in Huai River Basin and Taihu Lake in Jiangsu Province, China [J]. Environ Sci Technol, 2013, 47: 710-717. [crossref](#)
- [15] Wang T, Khim S J, Chen C, et al. Perfluorinated compounds in surface waters from Northern China: comparison to level of industrialization [J]. Environment International, 2012, 42: 37-46.
- [16] Chen H, Zhang C, Han J, et al. PFOS and PFOA in influents, effluents, and biosolids of Chinese wastewater treatment plants and effluent-receiving marine environments [J]. Environmental Pollution, 2012, 170: 26-31. [crossref](#)
- [17] 赵淑江, 曹培, 朱诚侃, 等. 温州近海海域海水及滩涂沉积物中PFOS 和PFOA 污染特征分析[J]. 海洋环境科学, 2012, 31(2): 221-224.
- [18] Pan G, You C. Sediment-water distribution of perfluorooctane sulfonate (PFOS) in Yangtze River Estuary [J]. Environmental Pollution, 2010, 158: 1363-1367. [crossref](#)
- [19] Lindstrom B A, Strynar J M, Delinsky D A, et al. Application of WWTP biosolids and resulting perfluorinated compound contamination of surface and well water in Decatur, Alabama, USA [J]. Environ Sci Technol, 2011, 45: 8015-8021. [crossref](#)
- [20] Benskin P J, Ikononou G M, Gobas A P C F, et al. Observation of a novel PFOS-precursor, the perfluorooctane sulfonamido ethanol-based phosphonate diester, in marine sediments [J]. Environ Sci Technol, 2012, 46: 6505-6514. [crossref](#)
- [21] Ferrey L M, Wilson T J, Adair C, et al. Behavior and fate of PFOA and PFOS in sandy aquifer sediment [J]. Ground Water Monitoring and Remediation, 2012, 32: 63-71.
- [22] Benskin P J, Muir C G D, Scott F B, et al. Perfluoroalkyl acids in the Atlantic and Canadian Arctic Oceans [J]. Environ Sci Technol, 2012, 46: 5815-5823. [crossref](#)
- [23] Pico Y, Blasco C, Farr e M, et al. Occurrence of perfluorinated compounds in water and sediment of L'Albufera Natural Park (Val encia, Spain) [J]. Environ Sci Pollut Res, 2012, 19: 946-957.
- [24] Esparza X, Moyano E, de Boer J, et al. Analysis of perfluorinated phosphonic acids and perfluorooctane sulfonic acid in water, sludge and sediment by

- [39] LC-MS/MS [J]. *Talanta*, 2011, 86: 329-336. 
- [40] Gómez C, Vicente J, Echavarri-Erasun B, et al. Occurrence of perfluorinated compounds in water, sediment and mussels from the Cantabrian Sea  
North Spain) [J]. *Marine Pollution Bulletin*, 2011, 62: 948-955. 
- [42] Kovarova J, Marsalek P, Blahova J, et al. Occurrence of perfluoroalkyl substances in fish and water from the Svitava and Svratka Rivers, Czech Republic
- [43] *Bull Environ Contam Toxicol*, 2012, 88: 456-460.
- [44] Zhao Z, Xie Z Y, Müller A, et al. Distribution and long-range transport of polyfluoroalkyl substances in the Arctic, Atlantic Ocean and Antarctic coast [J].
- [45] *Environmental Pollution*, 2012, 170: 71-77.
- [46] Kim S K. Watershed-based riverine discharge loads and emission factor of perfluorinated surfactants in Korean peninsula [J]. *Chemosphere*, 2012, 89: 995- 
- [47] 1002.
- [48] Zushi Y, Masunaga S. GIS-based source identification and apportionment of diffuse water pollution: perfluorinated compound pollution in the Tokyo Bay  
basin [J]. *Chemosphere*, 2011, 85: 1340-1346. 
- [50] Chimeddulam D, Wu K Y. River water contaminated with perfluorinated compounds potentially posing the greatest risk to young children [J]. *Chemosphere*,
- [51] 13, 90: 1617-1624.
- [52] Bao J, Liu W, Jin Y H, et al. Perfluorinated compounds in urban river sediments from Guangzhou and Shanghai of China [J]. *Chemosphere*, 2010, 80: 123- 
- [53] 130.
- [54] Ahrens L, Yeung W Y L, Taniyasu S, et al. Partitioning of perfluorooctanoate (PFOA), perfluorooctane sulfonate (PFOS) and perfluorooctane sulfonamide  
PFOSA) between water and sediment [J]. *Chemosphere*, 2011, 85: 731-737. 
- [56] Corsolini S, Sarkar K S, Guerranti C, et al. Perfluorinated compounds in surficial sediments of the Ganges River and adjacent Sundarban mangrove wetland,  
India [J]. *Marine Pollution Bulletin*, 2012, 64: 2829-2833. 
- [58] Harino H, Arifin Z, Rumengan F M I, et al. Distribution of antifouling biocides and perfluoroalkyl compounds in sediments from selected locations in  
Indonesian coastal waters [J]. *Arch Environ Contam Toxicol*, 2012, 63: 13-21. 
- [60] Naile E J, Khim S J, Hong S J, et al. Distributions and bioconcentration characteristics of perfluorinated compounds in environmental samples collected from  
the west coast of Korea [J]. *Chemosphere*, 2013, 90: 387-394. 
- [62] 贾成霞, 潘纲, 陈灏. 全氟辛烷磺酸盐在天然水体沉积物中的吸附-解吸行为[J]. *环境科学学报*, 2006, 26(10): 1611-1617. 
- [63] Pan G, Jia C X, Zhao D Y, et al. Effect of cationic and anionic surfactants on the sorption and desorption of perfluorooctane sulfonate (PFOS) on natural  
sediments [J]. *Environmental Pollution*, 2009, 157: 325-330. 
- [65] Chen H, Zhang C, Yu Y X, et al. Sorption of perfluorooctane sulfonate(PFOS) on marine sediments [J]. *Marine Pollution Bulletin*, 2012, 64: 902-905. 
- [1] 张靖1, 刘小龙2, 高洋1, 姜艳兴1, 李双1, 罗文芸1, 汪福顺1. 百花水库水质模拟及季节性水质恶化控制对策[J]. *上海大学学报(自然科学版)*, 2013, 13(5): 441-447

