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Article

Information Requirements under the Essential-Use Concept: PFAS Case Studies

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Cite This: https://doi.org/10.1021/acs.est.1c03732

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9. November 2021 – Andreas Buser (Folien z.T. von J. Glüge, ETH Zürich)

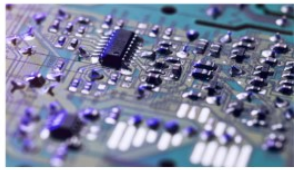
Einleitung – vorhergehendes Paper

Biotechnology

Building and Con-struction

Chemical industry

Electroplating



Electronic industry

Energy sector

Food production

Metal finishing

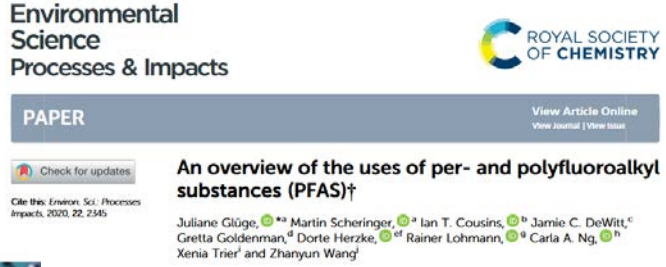
Mining

Nuclear industry

Oil & gas industry

Pharmaceutical industry

Photographic industry



- 2020 paper: identified more than 200 uses for more than 1400 individual PFASs
- 64 use categories (21 industrial branches, 43 other use categories)

Fallstudien

Consumer products	Industial uses
Bicycle lubricants	Chrome plating
Carpets	Chemical-driven oil production
Cleaning products	**Processing aids for aqueous emulsion polymerization of fluoropolymers**
	Semiconductor industry

Fahrrad-Schmiermittel

- PTFE may be used within a range of 5–25% per weight in dry lubes to reduce friction and wear
- Wet lubricants seem to contain less PTFE the SDS of a wet PTFE lubricant revealed a PTFE content of 1–3% per weight
- Less than 1% of PTFE may be added just for marketing purposes

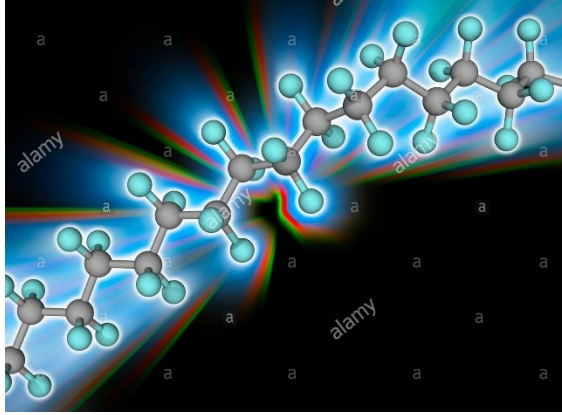
<u>Alternatives</u>

- Lubricants (plant-based products) without PTFE are on the market, are less persistent than PFASs

<u>Conclusion</u>

- Although PFASs in bicycle lubricants may increase lubricating performance, they are technically not needed to keep chains lubricated – **non-essential**

Hilfsmittel für wässrige Emulsions-polymerisation von Fluorpolymeren

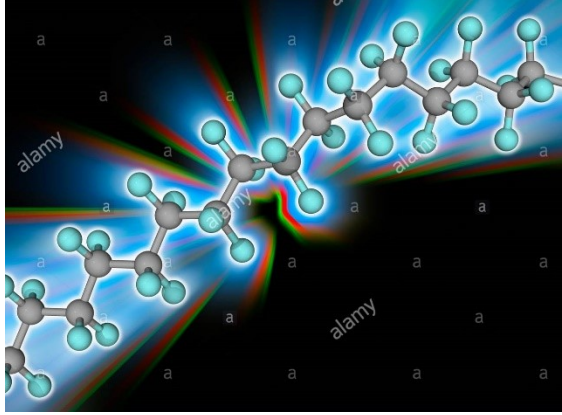


- Suspension polymerization generally does not involve (fluorinated) surfactants
  - results in larger polymer particles than aqueous emulsion polymerization
  - e.g., for granular PTFE
- Aqueous emulsion polymerization has traditionally involved the presence of a fluorinated surfactant, is used to produce fine-powder and dispersion products

<u>Alternatives</u>

- For the production of polyvinylidene fluoride (PVDF), processes with fluorine-free emulsifiers have been implemented by multiple manufacturers
- Fluorine-free emulsifier-based processes for manufacturing other fluoropolymers have been patented, but, to the best of our knowledge, are not yet implemented

Hilfsmittel für wässrige Emulsions-polymerisation von Fluorpolymeren



Alternative assessment of emulsifiers for polymerization of PVDF

- Some of the patents by Arkema use glycol-based polymers as emulsifiers; other patents describe alkyl phosphonates, vinyl/acryl acids, siloxanes or other substances
- The hazards of these emulsifier would depend on which of the substances are used
- According to Arkema:
  - many alternatives have been studied; some only enabled a good polymerization process but were not able to meet the risk objectives
  - some were able to meet both, which proves that it is possible to produce PVDF with alternative emulsifiers exhibiting a good ecotoxicological profile

Conclusion

The alternatives found for PVDF show that manufacturers need to carefully evaluate and manage their alternatives

Diskussion

Availability of and transition to alternatives

- The solution found by one manufacturer will be patent-protected and not directly available for others, which also explains why, e.g., in China PFOA is still used
- Patents generally reflect an early stage of research and development and cover options that might work in the processes to be further developed
- A lot of information is confidential business information and not available to the public
- The industrial case studies (and the available alternatives) require an in-depth understanding of the processes and details – evaluation of how well the alternatives work is very difficult
- Requirements from the regulatory side may help to transition to these alternatives. An example is California where carpet and rug manufacturers whose products contain PFASs are requested to submit a Priority Product Notification (PPN) since August 2021

Schlussfolgerungen

A transition to PFAS-free products:

- is possible for the consumer products investigated (and should be possible for most of the consumer products where PFASs are used)
- is much more challenging for industrial processes due to their complexity and processes that depend on each other
- will only be possible if industry is willing to cooperate (and maybe even lead as in the case of PFOS in the semiconductor industry)

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Article

Target and Nontarget Screening of PFAS in Biosolids, Composts, and Other Organic Waste Products for Land Application in France

Gabriel Munoz, Aurélia Marcelline Michaud, Min Liu, Sung Vo Duy, Denis Montenach, Camille Resseguier, Françoise Watteau, Valérie Sappin-Didier, Frédéric Feder, Thierry Morvan, Sabine Houot, Mélanie Desrosiers, Jinxia Liu, and Sébastien Sauvé*

Cite This: https://doi.org/10.1021/acs.est.1c03697

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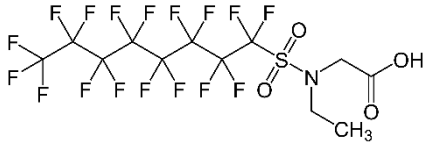

- 160 PFAS aus 42 Gruppen
- Klärschlämme und Komposte von 1976–1998: v.a. PFOS, *N*-EtFOSAA und andere kationische/zwitterionische ECF-Produkte (PFOS-Vorläufer)
- Neuere Proben (2009–2017): v.a. zwitterionische Fluortelomere wie 6:2-Fluortelomersulfonamidopropylbetain