

Start of the “PFCLoesch” project: Eliminating perfluorinated and polyfluorinated chemicals

Mobile and cost-efficient treatment of fire-fighting water

In order to provide an effective fire-fighting capability for major fires of fuels and solvents, for example at airports, inland ports, refineries or industrial storage facilities, the utilization of foam fire-extinguishing agents with perfluorinated and polyfluorinated chemicals (PFC) is in most cases indispensable. However, breakdown of fluorocarbon compounds (PFCs) is extremely difficult and they are, in part, toxic. Accordingly, they are damaging to the environment if they are not removed early on from the waste fire-fighting water. As consequence, therefore, fire-fighting water containing PFCs must be collected and processed or professionally disposed of.

Unfortunately established procedures are not specific and are very cost-intensive. Therefore, Fraunhofer UMSICHT and Cornelsen Umwelttechnologie GmbH have developed a new process in a 2-year group project with which PFCs can be eliminated effectively and economically from the fire-fighting water while still at the place of action. This process is a development of an existing joint development for the treatment of PFC-contaminated groundwater and combines activated carbon adsorption with an upstream purification stage.

Fewer process agents, fewer costs

In this pre-treatment process, the additive solution “PerfluorAd[®]” is added to the contaminated water leading to a precipitation of the dissolved PFC compounds. As a result, fewer process agents are required and consequently less PFC-contaminated hazardous waste disposal is required. In the case of waste fire-fighting water with a very high PFC burden, this process leads to significant cost reductions in comparison to conventional methods. The “PerfluorAd[®]” process also has additional benefits such as, for example, the natural raw ingredients from which PerfluorAd is developed. These “green” chemicals do not therefore pose a risk to human health or environment and, furthermore, that they are biodegradable after use. In addition, the process can be applied to the removal of other persistent polar pollutants such as residues from certain pharmaceutical products in wastewater. As such, the process provides an important contribution towards resolving other environmentally relevant challenges.

Tests in mobile pilot system planned

During the recently started project, Fraunhofer UMSICHT formulates the process chemicals which are optimized to real fire-fighting water and tested - at laboratory scale. At the same time suitable methods for process analysis are also developed. Once the researchers have determined the most effective process variant in the laboratory, the combination process will be tested in the mobile pilot system set up at Cornelsen Umwelttechnologie GmbH.

Subsequently, the team of Fraunhofer UMSICHT will compare the new treatment method to the classic PFC treatment processes such as a pure activated carbon adsorption in the context of a sustainability assessment. The economic assessment of the complete processes will be carried out by Cornelsen Umwelttechnologie GmbH.

The project's objective is to develop a treatment method for practical application that is both energy-efficient and resource-efficient as well as cost-optimized. Among the potential users of the new process are fire departments, insurance companies, and disposal companies as well as companies that have been affected by an acute fire event. In the future, Cornelsen Umwelttechnologie GmbH will design, build, and operate the fire-fighting water treatment systems.

The jointproject is funded by the German Federal Ministry of Education and Research (BMBF). It is part of the BMBF funding initiative "SME-innovative: Resource efficiency and climate protection" in the technology and application area of "Sustainable Water Management".

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