

Perspective of the waste water cleaning from PFAS by N-containing mesoporous silica

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Based on the assessment of the extent of exposure of per- and polyfluoroalkyl substances (PFAS) to public health, World Health Organization initiated the development of a basic document for Guidelines for Drinking Water Quality with an emphasis on perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA).

The purpose of this research is to explore the possibilities of using our sorbents to remove PFAS from simulated solutions and real water samples. A multicomponent PFAS solution model should be studied to understand the partitioning trend (e.g., pH, selectivity) and to assess the affinity of adsorbents for specific PFAS molecules. The mechanism of PFAS extraction by a series of adsorbents will be discussed. In order to solve this problem, as well as to offer qualitatively new materials as sorbents, we studied the sorption behavior of 20 anionic, neutral and zwitterionic PFASs, varying in the length of the perfluorocarbon chain (C₃-C₁₆, Fig. 1) and functional groups and probes of natural waste water, with 4 different sorbents based on SBA-15.

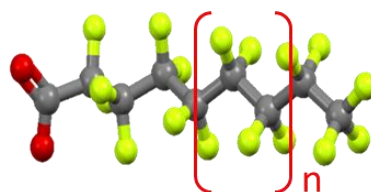


Fig. 1. The basic molecular structure of per- and polyfluoroalkyl substances

It was established that sorbents with a higher concentration of nitrogen-containing functional groups had the highest adsorption efficiency on PFAS, mainly due to electrostatic interactions.

Keywords: PFAS, SBA-15, sorption, water treatment.

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References:

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