PFAS REMOVAL FROM WATER THROUGH FLUORINATED CATIONIC RETICULAR MATERIALS

Tech ID: 34371 / UC Case 2026-066-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

To address the persistence of "forever chemicals" in global water supplies, UC Berkeley researchers have engineered a sophisticated class of reticular materials designed for the high-affinity capture of polyfluoroalkyl substances (PFAS). This technology utilizes Metal-Organic Frameworks (MOFs) and Covalent Organic Frameworks (COFs) that are post-synthetically modified to feature a dual-action defense. By creating a porous framework that mimics the chemical signature of the contaminants themselves, these materials provide a far more efficient and regenerable alternative to traditional activated carbon filters.

SUGGESTED USES

» Municipal Water Purification: Implementing high-capacity filtration stages in public water systems to meet increasingly stringent EPA health advisory levels for PFOA and PFOS.

» Industrial Site Remediation: Deploying porous frameworks at manufacturing discharge points or military firefighting training sites to strip PFAS from concentrated waste streams.

» Point-of-Use Consumer Filters: Developing advanced residential pitcher or under-sink cartridges that provide superior protection against short-chain PFAS compared to standard charcoal.

» Emergency Response: Utilizing mobile water treatment units for rapid decontamination of groundwater following accidental spills or firefighting foam application.

» Trace Analysis Tools: Enhancing laboratory detection limits by using these materials as pre-concentration agents for environmental water sampling.

ADVANTAGES

» Ultra-High Selectivity: The framework targets PFAS specifically, ignoring common background ions and organic matter.

» Regenerable Architecture: Unlike single-use carbon, these frameworks can be washed and reused, significantly reducing the secondary waste generated by water treatment processes.

» Tunable Pore Design: The reticular nature allows researchers to customize pore sizes to trap specific chain lengths, ranging from long-chain legacy chemicals to emerging short-chain alternatives.

» Chemical Robustness: These modified MOFs and COFs are engineered to remain stable in water over long periods, maintaining high performance across various pH and temperature ranges.

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Coordinative Alignment Of Molecules In Chiral Metal Organic Frameworks
- Exceptional Zeolitic Imidazolate Frameworks And A General Strategy To Make More
- Hydroxamate-Based Metal-Organic Frameworks
- Mof Heterolites: Mesoscopic Heterogeneity Within Order With Porous Nanocrystals
- Coumarin-Linked Covalent Organic Frameworks
- Thiazole-Based Covalent Organic Frameworks For Low-Humidity Water Adsorption

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OTHER INFORMATION

CATEGORIZED AS

» **Environment**
» Remediation
» **Materials & Chemicals**
» Chemicals
» **Research Tools**
» Other
» **Sensors & Instrumentation**
» Environmental Sensors

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