U.S. National Science Foundation
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Bio-Inspired and Biocatalytic Degradation of "Forever Chemicals"

Awardee
Geosyntec Consultants, Inc.

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PROJECT ABSTRACT

Per- and polyfluoroalkyl substances (PFAS) are a large group of compounds characterized as having carbon atoms linked to each other and bonded to fluorine atoms at most or all of the available carbon bonding sites. PFAS are known as "forever chemicals" because they are resistant to degradation except under highly energy-intensive conditions. Due to their widespread use in industries and consumer products, PFAS contamination can be found in many environments, including drinking water and food, and pose a significant threat to human health and the environment.

The Bio-Inspired and Biocatalytic Degradation of "Forever Chemicals" project, led by Geosyntec Consultants, Inc., aims at developing a cost-effective bio-inspired solution to destroy PFAS to permanently remove them from the environment. The solution involves the design of novel chemical pathways and catalysts inspired by biological systems. Because of its bio-inspired nature, the reaction occurs under mild conditions with very low energy input. In Phase 2, the team will apply this technology to develop and scale up treatment systems for specific environmental media such as biosolids and contaminated groundwater.

The convergence research will be supported by leading researchers in PFAS destruction, material/catalyst design, bioremediation and biological wastewater treatment. To accelerate the translation to practical application and maximize the impact of the solution, the project team will work closely with partners and end user communities such as nonprofit industry research organizations, wastewater utilities, government regulatory agencies and government and industry users to remove PFAS in the environment.