

Innovative sulfidized Nanoscale Zerovalent Metal Doped Biochar for Poly- and Perfluoroalkyl Substances (PFAS) Adsorption and Transformation, and Preventing PFAS Uptake by Crops

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Energy, Environment & Aerospace
Agriculture

Abstract

Poly- and perfluoroalkyl substances (PFAS) are associated with a variety of negative health effects, including liver disease, kidney disease, damage to the reproductive system, and cancer. These toxic chemicals are found in a wide range of products and have been found in water, soil, agricultural goods, and the human body. This innovation demonstrates an effective method of using a metal-doped carbon substrate that adsorbs and transforms these harmful chemicals, deterring them from affecting people and the environment.

What It Is

A metal-doped carbon substrate that attaches to and removes PFAS from water and soil.

Value Proposition

This technology is an effective, simple approach that destroys health-detrimental chemicals that affect soil, water, plants, animals, and humans.

Applicable Markets

Agriculture, soil treatment, civil and environmental engineering, soil remediation, groundwater remediation, water treatment, etc.

Benefit

Poly- and Perfluoroalkyl Substances (PFAS) are widespread and extremely harmful to humans, animals, and plants. Short- and long-chain PFAS exist, and few solutions are able to absorb both, further exacerbating the difficulty of removing PFAS from the environment. Further, PFAS are difficult to degrade due to the strong bond between carbon and fluorine, which is characteristic of these compounds. Growing concerns about the

widespread and harmful nature of PFAS demand an efficient and reliable solution.

This technology can adsorb, reduce, and oxidize both short- and long-chain PFAS. Specifically, this technology targets PFAS contaminants in groundwater and soil to prevent their uptake into agricultural products. This technology offers a robust solution to the problem of PFAS in the environment by removing and destroying PFAS using a reliable, regenerable method.

This simple approach prevents these chemicals from getting into our food, bodies, pets, and crops.

Market Application

This invention is most useful to remediation companies who specialize in soil and groundwater treatment. These companies will be able to use the technology to provide enhanced PFAS removal services to other companies, government entities, or private landowners.

Researchers

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Intellectual Property

U.S. Non-Provisional Patent Application, Published January 22, 2026, as US2026/0021478A, entitled "Sulfidized Nanoscale Zerovalent Metal Doped Carbon Substrate for Poly- and Perfluoroalkyl Substances (PFAS) Adsorption and Transformation."