Advanced Vapor Treatment and Innovative Sampling Method for Comprehensive Low-Temperature Thermal Desorption Studies in PFAS Remediation

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Discussion:

Per- and polyfluoroalkyl substances (PFAS) are persistent environmental contaminants that challenge conventional soil and groundwater remediation techniques. With the increasing use of thermal treatment for PFAS treatment, there is an imperative need to understand the behavior and removal kinetics of PFAS at various temperature gradients. This study proposes to explore these transitional phases (from 100°C to >350°C), focusing on Low-Temperature Thermal Desorption (LTTD) as a viable method for PFAS remediation. Prior studies, such as those by Barranco (2020) and Crownover (2019), have demonstrated partial success in PFAS removal at field scales but highlighted the need for improved vapor treatment techniques and better understanding of the mechanisms involved in low-temperature phases. Our approach integrates advanced vapor treatment technologies like GEO's C3 system to enhance efficiency and effectiveness in real-world conditions.

Implications:

The study emphasizes the potential of LTTD for PFAS remediation, particularly during transitional thermal phases, which have been underexplored. By addressing the gaps identified in previous studies, this research aims to provide a more comprehensive understanding of PFAS behavior across a range of temperatures. The integration of innovative vapor treatment technologies is expected to improve overall remediation efficiency, offering a more sustainable and cost-effective approach that meets environmental standards. Future work will focus on conducting field-scale studies to validate these concepts and optimize LTTD application for PFAS treatment.