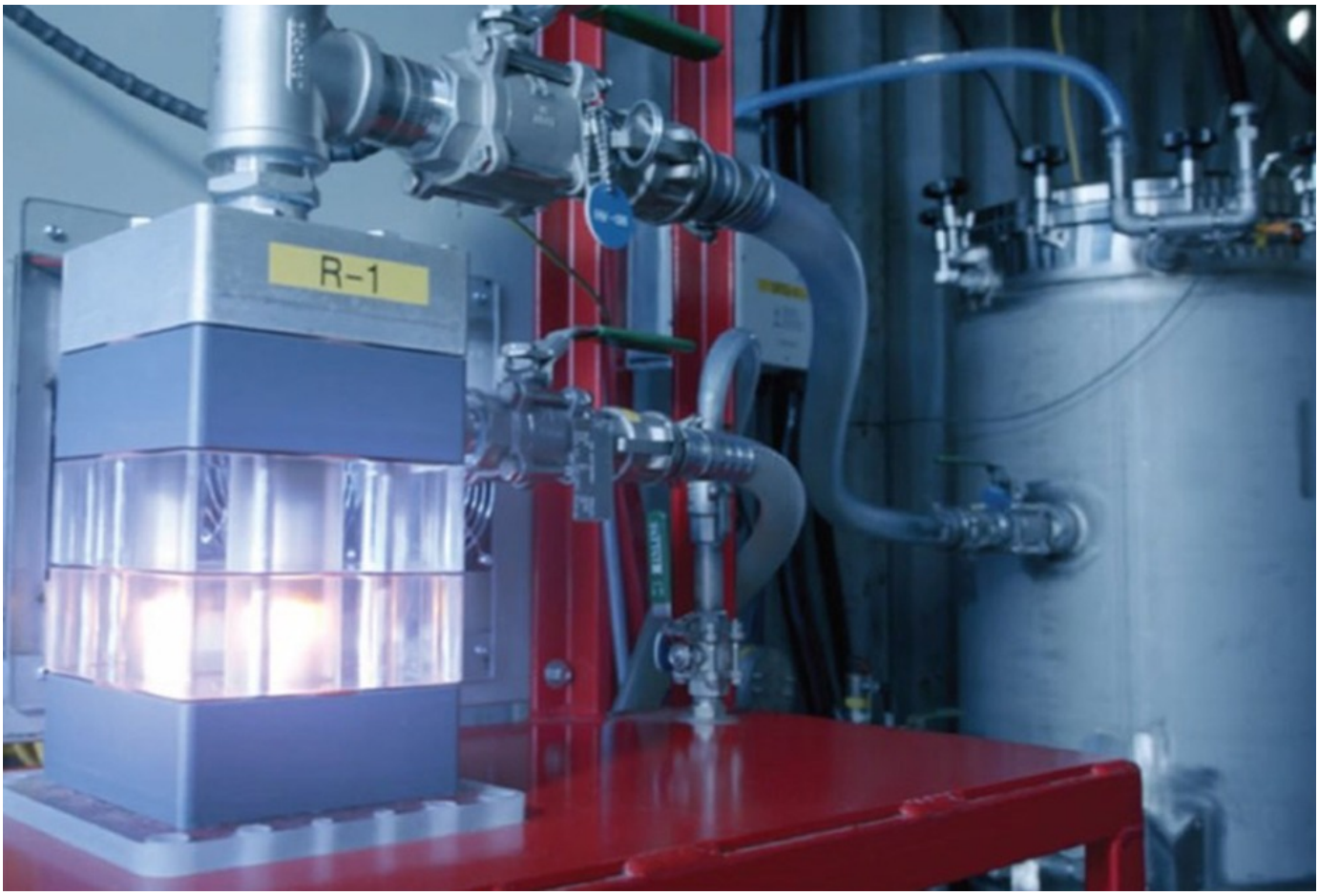


Publication

# Emerging technologies for PFAS control

Plasma vortex reactor showing glowing plasma arc (reprinted with permission from Onvector LLC).

Haley & Aldrich Principal Consultant Tiffany Thomas, Ph.D., along with co-authors Somath Basu and Priyanka Ali, has published a wide-ranging overview of current and emerging options for managing the negative impacts of PFAS in water and wastewater. Their review, "Emerging Technologies for PFAS Control," appears in the Water Environment Federation's book *PFAS in the Water and Wastewater Sectors: Fundamentals, Management, and Treatment* (August 2023).

The book covers the current understanding of PFAS, their implications for human health, and the growing regulatory framework, as well as the various treatments available for water, wastewater, groundwater, biosolids, leachates, and soil/sediments. In Chapter 11, Tiffany and her co-authors focus on how "variability in the physiochemical properties of various PFAS compounds" may require multiple remedial options to meet emerging regulatory standards.

As Tiffany and her colleagues explain, the carbon-fluorine bond present in PFAS is the most energetically stable organic bond, which rules out most classical destructive technologies used for other contaminants. At present, removing PFAS from contaminated media is limited to varied technologies of physical sequestration, adsorption, or filtration. Though these technologies may effectively *immobilize* PFAS, the molecules themselves remain largely intact, so they need additional treatment technologies to achieve complete mineralization.

Tiffany and her co-authors summarize how emerging technologies (including some already being commercially deployed) demonstrate the promising abilities to both remove and destroy PFAS from aqueous matrices, with promising results. They also discuss the advantages and limitations of established technologies (including physicochemical treatment by granular activated carbon adsorption, ion exchange, and membrane separation).

As Tiffany and her co-authors emphasize in this wide-ranging and practical analysis: It's unlikely there will ever be a *single* solution for PFAS treatment at all types of sites. Any process must be selected on a case-by-case basis and in close coordination with service providers. As PFAS contamination continues to come into sharper public and regulatory focus, all types of treatment technologies will need to play stronger, more adaptable, more sustainable roles.