



PFAS in Air – Analysis and Monitoring for Thermal Products of Incomplete Destruction

This presentation will provide an overview of occurrence and sources of per- and polyfluoroalkyl substances (PFAS) in air with a focus on sampling and analytical techniques to identify and quantify known compounds of concern, and new compounds identified as products of incomplete combustion – an important consideration for destruction technology development.

PFAS are a group of synthetic chemicals that are used in various products and can be released into the air through industrial processes, waste treatment plants, and other sources. This can include volatile PFAS in the gas phase, or PFAS that have sorbed onto particulate.

PFAS in the air can be inhaled, potentially leading to various health effects that have been linked to PFAS exposure. While inhalation exposure is (generally) likely to be less significant than ingestion or dermal exposure, it is still a pathway for PFAS to enter the body (EPA). In some scenarios it may be a major pathway.

Certain PFAS exhibit distinct volatility characteristics based on their chemical properties. For some compounds, such as perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) that have low vapor pressures and high water solubility, their ability to partition from water into the air is restricted. Conversely other PFAS contain certain functional groups and properties that enhance their volatility, enabling them to more readily transition from aqueous environments into the atmosphere.

As global efforts intensify to reduce PFAS exposure, innovation in remediation technologies is accelerating. These technologies generally aim to:

- Remove PFAS-contaminated materials from the environment.

- Extract PFAS from those materials.

Once removed, PFAS waste is typically stored, landfilled, or destroyed to prevent re-exposure. Although new destruction methods are emerging, they lag remediation efforts. Industrial incineration, used for nearly a century, remains the most common large-scale PFAS destruction method. However, its actual destruction efficiency (DE) remains uncertain. At lower temperatures, stable perfluorinated alkane and alkene products of incomplete combustion (PICs) may form. If released, these PICs reintroduce PFAS into the environment and, as potent greenhouse gas (GHG) compounds, contribute significantly to the GHG impacts of incineration.

To monitor PFAS emissions, the U.S. EPA developed two methods:

- OTM-45 (2021): Targets long and short chain PFAS using existing water methods and LC-MS/MS.

- OTM-50 (2024): Focuses on PICs and industrial compounds of interest including fluorinated refrigerants using evacuated canisters and GC-MS.

These methods aim to help operators and regulators assess emissions, verify destruction and mineralization, and guide process improvements. ALS has developed a method for non-polar volatile PFAS by canister based on the EPA OTM-50 method compound list and quality control criteria. The presentation will describe the challenges faced in method development, results of method validation studies and data from initial field trials.

Tammy Chartrand ALS Canada

As the National PFAS Program Lead, Tammy Chartrand is responsible for leading ALS's market position related to the retention and growth of PFAS service offerings in Canada. Her focus is primarily engaging with the public sector, external stakeholders, and industry leaders while also supporting operational leadership and building the knowledge capacity of the service delivery team. Tammy works closely with the global network of ALS labs to stay at the forefront of PFAS analysis. Collaborating on research, standardization practices and staying up to date with the latest global PFAS

regulations and trends. She holds a Bachelor of Science degree from the University of Ottawa and has over 10 years of experience in the environmental industry. Tammy started her career with ALS in 2016, following several years in the Federal public sector. She has been involved in the PFAS space supporting operations and client engagement since 2021.

“