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# Identification of oxidized mercury compounds with GC/MS

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The primary route of human exposure to mercury is through consumption of contaminated fish. Most mercury pollution is emitted to the atmosphere, however, and it can be transported around the globe before being deposited to aquatic ecosystems. The location and bioavailability of deposited mercury largely depends on poorly understood atmospheric chemical reactions that convert elemental mercury into oxidized mercury compounds. Current measurement methods for mercury have been shown to be biased low and are unable to distinguish which oxidized mercury compounds exist in the atmosphere. This knowledge gap has led to considerable speculation but no clear consensus about the dominant oxidation reactions is available for atmospheric mercury.

A suite of tools to accurately quantify and identify atmospheric oxidized mercury compounds is being developed. One of these tools is a gas chromatography/mass spectrometry-based system for identification and quantification of atmospheric oxidized mercury compounds. The system consists of a collection surface to concentrate mercury compounds from the ambient atmosphere, a thermal desorption module, a cryofocusing system, a gas chromatograph, and an ultra-sensitive mass spectrometer. Preliminary data show that this system can separate and detect mercury halides that are thought to exist in the ambient atmosphere. Work is underway to test several atmospheric collection techniques and additional mercury compounds, and to optimize the system to minimize sample loss and maximize sensitivity.

## Biography

Seth Lyman earned a PhD in Environmental Science and Health from the University of Nevada, Reno, and subsequently worked as a Postdoctoral Researcher and research faculty member at the University of Washington-Bothell. Currently, he is the Director of the Energy and Environment Research Team at Utah State University's Bingham Entrepreneurship and Energy Research Center in Vernal, Utah. His research focuses on emissions, transport, and fate of atmospheric environmental contaminants, including ozone precursors, particulate matter, greenhouse gases, and mercury.

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