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EMSL In Brief

Environmental Molecular Sciences Laboratory

Advanced Mass Spectrometers Support Texas Field Campaign

Three portable mass spectrometers that are part of the Environmental Molecular Sciences Laboratory's (EMSL's) suite of state-of-the-art research instruments played an important role in a study of hydrocarbons and aerosols in the atmosphere during a recent field campaign in Houston.



In a study supported by the Texas Environmental Research Consortium, PNNL and EMSL researchers used EMSL mass spectrometry capabilities to measure hydrocarbons and aerosols in the atmosphere in industrialized Houston.

The September 2006 campaign involved EMSL researchers and users as well as scientists from the Pacific Northwest National Laboratory (PNNL), who joined forces with colleagues from around the world to examine the distribution of ozone-damaging gas and particles in an industrialized environment within the greater Houston area. Measurements were taken using the mass spectrometry combination from three locations associated with elevated ozone levels: (1) in the southeast portion of the city near the largest complex of petrochemical and oil refineries in the world; (2) in southwest Houston, where nitrogen emissions from automobiles are prevalent; and (3) north of Houston, near natural sources of hydrocarbons. The combined use of EMSL's mass spectrometers—a Quadrupole Aerosol Mass Spectrometer, a Time-of-Flight Aerosol Mass Spectrometer, and a Proton Transfer Reaction-Mass Spectrometer—resulted in a unique data set that will help the researchers answer questions related to hydrocarbon/aerosol interactions.

This recent study followed a campaign conducted in 2000 to provide an understanding of how ozone levels in Houston far exceeded those found elsewhere in the United States, and how they amassed in such a short time. Results from the 2006 study will help researchers now determine the effectiveness of emissions controls, implemented following the 2000 study, in reducing high ozone episodes.

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