

DEVELOPMENT OF A FIELD-PORTABLE AIR MONITOR FOR LEWISITE

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The focus of this research is the development of a prototype field-portable ambient-air monitor for measuring trace levels of volatile organoarsenicals. Lewisite (dichloro[2-chlorovinyl]arsine) is a chemical warfare agent developed during World War I and stockpiled on a large scale by the former Soviet Union. A continuous air monitor for Lewisite at the eight-hour time-weighted-average concentration ($3 \mu\text{g}/\text{m}^3$) is necessary to protect the safety and health of arms control treaty inspectors. Flow injection is used to integrate an air sampling device based on liquid-phase extraction with a flow-through detector based on potentiometric stripping analysis. We describe a method for the sampling and preconcentration of organoarsenicals from ambient air by using a gas permeation membrane sampler. The sampler is designed to selectively preconcentrate analyte that permeates a silicone rubber membrane into a caustic carrier stream. Instrument design is described for the sampling and detection methodologies.

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Keywords: flow injection, potentiometric stripping, 2-chlorovinyl arsonous acid, dichloro(2-chlorovinyl)arsine, Lewisite.

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