

A-2 Research project on methyl bromide and halocarbons: its behavior in the atmosphere and development of the technologies for reduction, recovery, and destruction

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Methyl bromide is a significant ozone-depleting gas with both natural and anthropogenic sources. The sources and sinks of methyl bromide must be better quantified to more accurately determine the current and future ozone depletion potential of this compound. Given the wide range of methyl bromide uses in agriculture, a variety of alternatives to this chemical compound are needed to replace its use as it is phased out. Further, development of technologies for reduction, recovery, and destruction of methyl bromide is needed. In order to answer above problems, the following studies were carried out in this fiscal year.

- (1) **Atmospheric chemistry related to methyl bromide and its alternatives.**
 - ① **Studies on source, distribution, and reactions of methyl bromide and its alternatives in the atmosphere:** Photochemistry of chloropicrin under atmospheric conditions was investigated.
 - ② **Source Identification of methyl bromide by radio-active carbon isotope measurement:** A large volume sampler for CH₃Br was constructed.
- (2) **Development of the technologies for reduction, recovery, and destruction of methyl bromide.**
 - ① **Research of Existing Use and Development and Evaluation of Technologies of Recovery and Destruction for Methyl Bromide:** Methods for recovery and destruction of CH₃Br were evaluated.
 - ② **Study on Evaluation of Methyl Bromide Emission to the Atmosphere in Soil Fumigation in Japan:** Methods for reducing CH₃Br emission during fumigation were developed.
 - ③ **Development of Alternative Methods to Methyl Bromide for Controlling Soil-borne Plant Pathogens and Nematodes:** The alternative methods for soil sterilization were examined.
 - ④ **Development of Techniques for Decomposition of halogenated Organic Compounds:** Three different methods were investigated for the decomposition of methyl bromide.
 - ⑤ **Recovery and Emission Control of Methyl Bromide by Adsorption:** Activated carbon fiber from polyvinyliden chloride was developed.
 - ⑥ **Studies on the Molecular Design of Highly Efficient Halon Replacements and Their Basic Evaluation as Fire Extinguishers:** Fire-extinguishing ability of a perfluoroether and perfluorosulfur compounds was evaluated.
 - ⑦ **Exposure and Risk Evaluation of Methyl bromide and Related Chemicals in Human:** Exposure assessment was carried out.