



LABMAIL #10

JUNE 2011

ANALYSIS FOR C1 – C2 GASES IN WATER INCLUDING METHANE

INTRODUCTION

ALS Czech Republic has validated method for the determination of methane, ethane, ethene and ethyne in aqueous matrices. The determination is based on the US EPA method RSK – 175. The analysis of dissolved gases in ground water is important in determining whether intrinsic bioremediation (natural attenuation) is occurring in a fuel- or solvent- contaminated area. (1)



The gases of concern include methane, ethane and ethylene. Under anoxic conditions, the bioremediation process for fuel hydrocarbons shifts toward production of methane whereas chlorinated solvents, such as trichloroethylene are subjected to dechlorination. The final products are ethane and chloride. (1)

The method consists of generating a headspace in a water filled bottle, and analysis of the headspace by gas chromatography with FID detection.

Method code: W-GASFID01

Analytes determined by the method are listed in Table I.

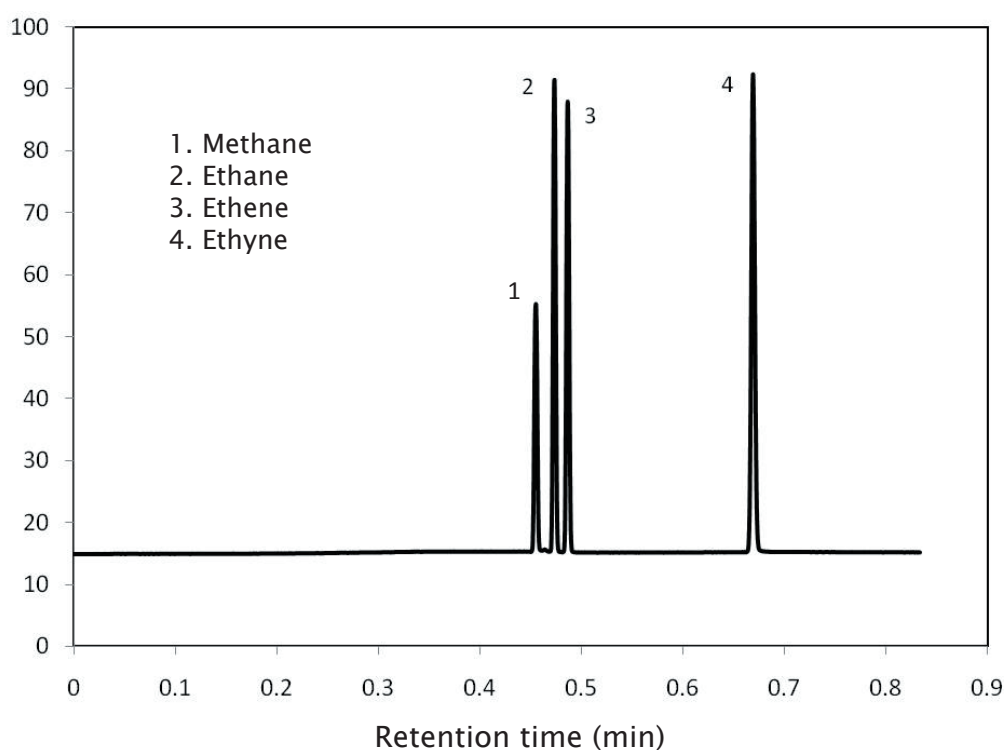
Table I.

Compound	LOR* (µg/L)	CAS number**	Volume container
Methane	2	74-82-8	2 x 40 mL glass vial
Ethane	1	74-84-0	
Ethene (Ethylene)	1	74-85-1	
Ethyne (Acetylene)	1	2122-48-7	

* LOR – Limit of Reporting

** CAS – Chemical Abstract Service Register Number

Chromatogram showing the analysis of C1–C2 gases in water



Methane

Methane is a not toxic, colourless and odourless gas naturally released from a geological subsoil. Dangerous is methane ability to cumulate in wells and water pipelines. A mixture of methane with air is explosive. (2)

Sample container

At least two EPA vials (40 ml) equipped with screw full-caps and PTFE septum. The vials have to be filled with zero headspace and quickly capped. Samples should be preserved by acidification by 2 drops of diluted sulfuric acid (1:1) and kept at cooled conditions. Holding time is 14 days.

Scope and application

The method is applicable to a wide range of waters (drinking water, ground water, water from lakes, technological water, waste water). The method has been accredited.

Interference

Methane is a very common contaminant and occurs naturally in the atmosphere. Also, automobile exhaust contains high levels of target compounds. (3)

Routine TAT is 7–10 days after sample reception.

References:

- (1) Kampbell, D. and Vandegrift, S. Analysis of Dissolved Methane, Ethane, and Ethylene in Ground Water by a Standard Gas Chromatographic Technique, J. Chromatogr. Sci., Vol. 36, 1998, pp. 253 – 256
- (2) Methane, <http://en.wikipedia.org/wiki/Methane>
- (3) Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene. US EPA, Region 1 – New England, NATATTEN.WPD, Revision 1, Date 02/21/02

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