

Direct determination of hydrogen, methane and carbon dioxide gasses in solutions using gas chromatography equipped with gas-liquid separation tube.

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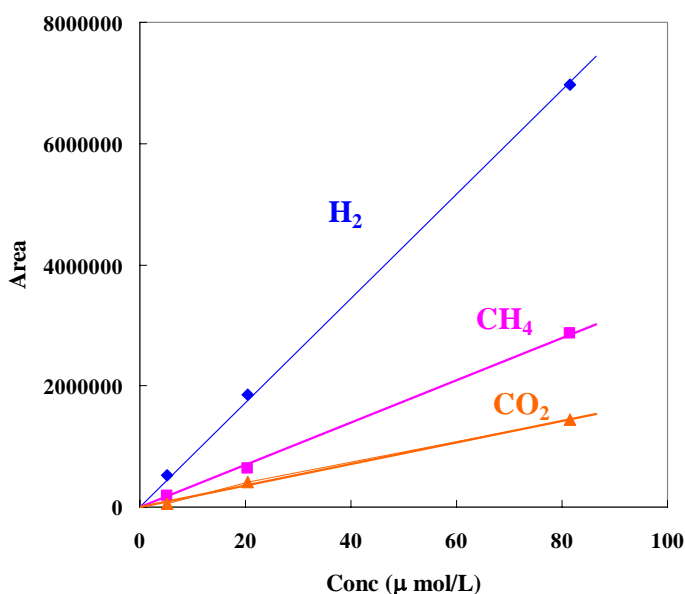
Dense, abundant and diverse populations of animals have been found associated with the active venting of super-heated water in the deep-sea hydrothermal system along Mid Ocean Ridges (MOR). These macrofaunal populations were strictly dependent on the primary production of symbiotic and free-living chemolithoautotrophic microorganisms. They obtain energy for carbon fixation, biosynthesis and other any living activities from inorganic substances such as H_2S , CO_2 , H_2 , CH_4 entrained by hydrothermal fluids from the earth interior. For better understanding of these eco-systems, accurate analysis of trace-level gasses in the hydrothermal fluid is greatly required.

We have developed the rapid and accurate technique for direct measurement of trace-level H_2 , CH_4 and CO_2 gasses in seawater through tandem gas chromatography equipped with a gas-liquid separator. Advantages of this technique are as follows:

1. Possible on-line gas analysis.
2. High recovery because of extremely low loss of gasses during the extraction procedure from the liquid.
3. Low blanks from air.
4. Rapid measurement.
5. High sensitivity.

Direct loading of a sample leads to most of these advantages.

As a result, we have obtained the reliable calibration curves even for very low concentration samples such as a few $\mu\text{mol/L}$ as shown in Fig. 1.



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