

光音響効果に基づく実験教材の開発 ～縦列配置によるエネルギー収支の考察～

(北科学大工¹・北大環境院²) ○福原朗子¹・山中康裕²

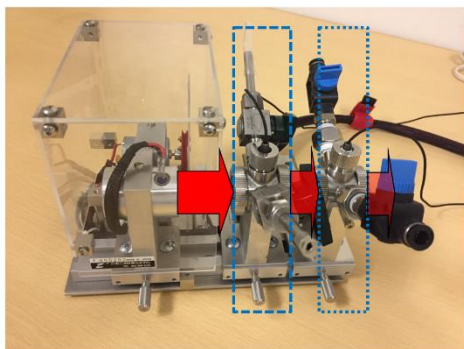
Developing experimental materials based on photoacoustic effect: Estimation of the energy budget by two gas cells in tandem (¹*Faculty of Engineering, Hokkaido University of Science*, ²*Graduate School of Env. Science, Hokkaido University*) ○Akiko Fukuhara,¹ Yasuhiro Yamanaka²

We developed an experimental material to study the infrared budget of greenhouse gases. An experimental device based on the photoacoustic effect, which measures the infrared absorption of gases, can help students understand the greenhouse effect. In this study, two gas cells are used to estimate the energy budget for the infrared incidence and transmission as well as absorption. In addition, the amount of absorption in each absorption wavelength band of carbon dioxide and methane were estimated from the results of absorption spectrum measured by putting these gas cells directly into the FTIR. The radiant intensity of the IR source temperature was used as a coefficient. We conducted several classes using this device for students.

Keywords : *Energy Budget, Infrared Absorption, experimental materials, greenhouse effect*

温室効果ガスの赤外収支を学ぶ実験教材を開発した。光音響効果に基づく実験装置は、気体の赤外吸収を測定するものとして、生徒が温室効果を理解するのに役立つ。本研究では、2つの気体セルを用いてそれぞれの音響信号を測定し、赤外の吸収とともに入射と透過に関するエネルギー収支が推定できるようにした。また、気体セルをそのまま FTIR に入れて吸収スペクトルを測定した結果から、二酸化炭素とメタンの各吸収波長帯における吸収量を推定した。光源温度の放射強度を係数として用いた。高校生や大学生を対象に、この装置を用いた授業を行った。

入射(光源) = 吸収(セル1) + 透過(セル2)



CO₂とCH₄の吸収スペクトル

