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Detection of 13CO2 and 12CO2 using diode laser driven Raman scattering

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Detection of small quantities of trace gases and Isotope mixtures have been a domain of mass spectroscopy, since no other technique proved to be as sensitive.

But with the advent of the laser and suitable laser diode sources, some optical methods where examined for their useability for trace gas and isotope ratio detection. Some of them are: Tunable laser spectroscopy with near-IR diode lasers, Laser photoacoustic spectroscopy, Fourier transform infrared spectroscopy, Cavity ring down Spectroscopy and Intracavity Spectroscopy (1, 2).

Another well known technique is Raman spectroscopy, which - although suggested by Bloom et al 1976 (3) - has not been used so far for determining isotope ratios. A research group in Austin/Texas used a laser Raman setup to discriminate the NIR Bands at 1388 cm-1 for 12CO2 and 1370 cm-1 for 13CO2 (4, 5).

With this contribution we present a similar setup, to measure the Raman spectrum of CO2 in order to find out the limit of the sensitivity for this method.

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