

P5658 SPECTROSCOPIC DETECTION OF METHANE AT A PPT SENSITIVITY LEVEL IN MID-IR WITH A LONG-PATH MULTIPASS CELL

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1. In this work, we designed a mid-IR multipass cell with an optical path of 580 m, which is the longest optical path in the MIR reported to date.
2. We built a sensitive methane sensor and used two measuring methods of direct absorption spectroscopy (DAS) and wavelength modulation spectroscopy (WMS).
3. With DAS method, in the measurement of methane in atmospheric air, the signal with the high signal-to-noise-ratio (SNR) of 44 dB and the detection limit of 3 ppb with an averaging time of 200 s was achieved using the wavelet denoising method.
4. The sensitivity of the sensor was further improved with the WMS technique, the SNR was increased to 70 dB and the detection limit of 560 ppt was achieved with an averaging time of 290 s, thus permitting the ppt level of methane detection.

