THEORETICAL AND EXPERIMENTAL ADVANTAGES OF A COMPACT MIRAGE SPECTROSCOPY SETUP FOR TRACE GAS DETECTION

B. ZIMERING and A.C. BOCCARA, *CNRS UPR A0005, Laboratoire d'Optique Physique, ESCPI, 10, rue Vauquelin, Paris 75005, France.*

We present the advantages of a compact setup for real time *in situ* trace gas detection based on photothermal deflection spectroscopy optimized for practical applications[a]. The use of high quality Ge windows permits a true parallel geometry, resulting in a design resistant to ambient air motion while preserving the advantages the technique presents with respect to standard absorption spectroscopy, such as good sensitivity, local sample probing and open air measurement capability. We estimate the detection limit of C_2H_4 in an N_2 atmosphere to be 100 ppt, and have measured real time *in situ* emissions from a variety of solid and semisolid samples to evaluate environmental, industrial, and agricultural applications.

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