OH DETECTION USING OFF-AXIS INTEGRATED CAVITY OUTPUT SPECTROSCOPY (OA-ICOS)

CHRISTOPHE LENGIGNON[a], WEIXIONG ZHAO[b], WEIDONG CHEN, ERIC FERTEIN, CECILE COEUR, *Laboratoire de Physico-Chimie de l'Atmosphere, Universite du littoral Cote d'Opale, Dunkerque - France*; DENIS PETITPREZ, *Laboratoire de Physicochimie des Processus de Combustion et de lAtmosphere, Universite des Sciences et Technologies de Lille, 59655 Villeneuve d'Ascq Cedex - France*.

The OA-ICOS cavity consisted of two 1 high reflectivity spherical mirrors with 1 m radius of curvature, separated by a 0.5-m long quartz coated stainless steel tube. The mirrors reflectivity was $> 99.996\%$ at 1435 nm as specified by the manufacturer (Layertec, GmbH). The effective optical path length of the OA-ICOS approach was determined with direct absorption signal intensity of the pure H2O vapor line at 6965.80233 cm-1 and was found to be 1.263 km.

The OH radicals were generated with the help of a 2.45 GHz microwave discharge in water vapor flow under low pressure (1 mbar) to evaluate the developed OA-ICOS performance. The OH radical concentration of 7.28 e+13 OH/cm3 was determined using calibration with a close H2O absorption line at 6965.80 cm-1. The detection limit, deduced from the signal to noise ratio, was 3.86 e+11 OH/cm3. Experimental instrument detail and the preliminary measurement results will be presented and discussed.

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