UV CAVITY RING-DOWN SPECTROSCOPY OF HYDROCARBON FLAMES. CONCENTRATION AND TEMPERATURE MEASUREMENTS

V. A. LOZOVSKY, *Semenov Institute of Chemical Physics, Russian Academy of Sciences, 4 Kosygina str., 117977 Moscow, Russia*; I. DERZI and S. CHESKIS, *School of Chemistry, Sackler Faculty of Exact Sciences, Tel Aviv University, Ramat Aviv, Tel Aviv 69978, Israel*.

Cavity Ring-Down Spectroscopy in the UV spectral range (UV-CRDS) was used for measurements of absolute concentration profiles of several radicals in low pressure hydrocarbon flames. The use of absorption spectroscopy for such measurements has important advantages in comparison with other widespread methods, for example Laser Induced Fluorescence (LIF). CH radical concentration was measured using $C^2\Sigma$-$X^2\Pi$ band near 314 nm. Many lines of the $^2\Sigma$-$^2\Pi_i$ transition of the OH radical are also located in this range that allow simultaneous measurements of the concentration profiles of these very important radicals in combustion. The OH lines could be also used for accurate rotational temperature measurements.[a] The minimum detectable concentration were measured to be 2x10^{11} cm^{-3} for OH and 2x10^{10} cm^{-3} for CH radicals. Simultaneous OH(v"=0) and OH(v"=1) absolute concentration measurements near 312 nm show strong deviation from thermal equilibrium in the pre-flame zone. This is in contrast with the rotational distribution, which could be fit well by the Boltzmann law.

[a] S. Cheskis, I. Derzi, V. A. Lozovsky, A. Kachanov, D. Romanini, *Appl. Phys. B.*, in press