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Experimental and simulation study of the OH radical generation in atmospheric pressure microwave plasma MARGARITA BAEVA, KRISTIAN RACKOW, JORG EHLBECK, INP Greifswald e.V., Germany — Hydroxil radicals play an important role in non-equilibrium plasmas for decomposition of gaseous pollutants, initiation of surface reactions, synthesis of methanol from methane, etc. Experimental and simulation studies of a coaxial microwave plasma source operating at 2.45 GHz in atmospheric pressure $H_2O/N_2/O_2$ gas are carried out. Optical emission spectroscopy is applied to observe the OH (A-X, 309 nm) emission intensity. The variation of the $O_2$ concentration allowed to look at the transition from the $N_2$ dominated emission spectrum to NO emission spectrum. The rotational temperature is obtained from simulated spectra of the $N_2^+$ first negative system and NO transitions at 248 nm and 272 nm. The experiment is completed with a global kinetic model delivering the electron density and temperature, the electric field amplitude, and the species densities for absorbed microwave power from 500 W up to 1000 W and gas temperatures between 3000 K and 5000 K. A 2D model of the plasma source based on Maxwell’s equations is applied to obtain the distribution of the electric field and the absorbed power density.