

Abstract Submitted
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The influence of electrohydrodynamic flow on the distribution of chemical species in positive corona¹ FRANCISCO PONTIGA, University of Seville, KHELIFA YANALLAH, University of Sheffield, R. BOUAZZA, University of Tiaret, JUNHONG CHEN, University of Wisconsin — A numerical simulation of positive corona discharge in air, including the effect of electrohydrodynamic (EHD) motion of the gas, has been carried out. Air flow is assumed to be confined between two parallel plates, and corona discharge is produced around a thin wire, midway between the plates. Therefore, fluid dynamics equations, including electrical forces, have been solved together with the continuity equation of each neutral species. The plasma chemical model included 24 chemical reactions and ten neutral species, in addition to electrons and positive ions. The results of the simulation have shown that the influence of EHD flow on the spatial distributions of the species is quite different depending on the species. Hence, reactive species like atomic oxygen and atomic nitrogen are confined to the vicinity of the wire, and they are weakly affected by the EHD gas motion. In contrast, nitrogen oxides and ozone are efficiently dragged outside the active region of the corona discharge by the EHD flow.

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