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Simulation for spatio-temporal variation of chemically active species in an atmospheric pressure streamer discharge.. ATSUSHI KOMURO, KAZUNORI TAKAAHSHI, AKIRA ANDO, Department of electrical engineering, Tohoku University — Spatiotemporal variation of radical density in an atmospheric pressure plasma discharge has been investigated by two-dimensional numerical simulation. Behaviors of radicals are characterized by four areas as Hot anode region, Secondary streamer region, Primary streamer region, and Near-cathode region. Although the reduced electric field in Hot anode region is relatively high, the gas temperature also increases and the ozone destruction process proceed. On the other hand, in Near-cathode region, the high-energy radicals such as $N(4S)$ is effectively produced because the instantaneous value of reduced electric field is high. Behaviour of OH is also investigated. The results show that OH is effectively produced in Secondary streamer region and is not effective in Hot anode region. This is because the reduced electric field in Secondary streamer region is sufficiently high for the dissociation of H_2O by $O(D)$ and $N_2(a)$ and the gas temperature in Hot anode region is too high for the production of OH.

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