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Numerical study of plasma dynamics and temporal-spatial variation of O and OH concentrations in atmospheric pressure plasma jets impinging on different substrates YUANYUAN JIANG, YANHUI WANG, DEZHEN WANG, Dalian University of Technology — Atmospheric pressure plasma jets (APPJs) have been gaining attention because of their great potential in various fields, e.g. sterilization, surface process and plasma biomedicine. We explore the influence of gas flow rates and dielectric constant of the substrates on the jet structure and production and transportation of reactive oxygen species (O and OH) in direct-current voltage driven atmospheric pressure helium-nitrogen mixture plasma jet (propagating into humid air) for the humid air impurity level of 0.1% using a 2D fluid model. Gas flow rates affects not only the structure of the APPJs, but also the concentration of the O and OH. The surface integrated flux of O and OH decreases with the increasing of gas flow rates due to the reduction of the air diffusion. When the permittivity of the substrate is raised, the propagation length of the surface ionization wave along the dielectric surface decreases, but the production of the reactive oxygen species and the surface integrated flux to the substrates increase. The results presented here can provide a clear understand on the applications of the APPJs for us.

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