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Atmospheric pressure plasma jet for surface treatment: a simulation perspective

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Atmospheric pressure plasma jets (APPJs) can be sustained in ambient air without a vacuum system, with a “cold” plasma plume of gas temperature down to room temperature, while consisting of abundant reactive species, promoting their promising applications in the surface treatment, especially in thermal-sensitive scenarios. In this talk, simulations results yielding from fluid modelling with drift-diffusion approximation will be present to give insight into the physics-chemistry processes and mechanisms in APPJ-surface interactions, which are difficult to be achieved by experimental diagnosis limited by the spatial-temporal resolutions. Effects of the gas compositions, the surface morphologies, the structures and materials of the treated samples will be discussed.

References

[1] Ning W, Dai D, Zhang Y, et al. Effects of trace of nitrogen on the helium atmospheric pressure plasma jet interacting with a dielectric substrate[J]. Journal of Physics D: Applied Physics, 51(12): 125204, 2018.
[2] Kong X, Li H, Yang W, et al. Atmospheric pressure plasma jet impinging on fiber arrays: Penetration pattern determined by fiber spacing[J]. Applied Physics Letters, 122(8): 084101, 2023.
[3] Ning W, Dai D, Li L. Atmospheric pressure plasma jet impinging on a wavy dielectric surface: effects of DC polarities[J]. Plasma Sources Science and Technology, 27(8): 2018.