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