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Comparative study on atmospheric-pressure helium plasma jets driven by pulsed voltage with different polarity WANG YANHUI, JIANG YUANYUAN, ZHANG JIAO, WANG DEZHEN, Dalia University of Technology — Atmospheric-pressure plasma jets, have shown immense potentials for numerous industrial and biomedical applications. To understand the physical and chemical processes taking place in plasma jet, numerous studies have been carried out, but, there are still many aspects to be explored further. In this paper we focus on the effect of pulsed-voltage polarity on the characteristics of the atmospheric pressure helium plasma jets propagating into humid air. A two-dimensional neutral gas transport model and a plasma dynamics model are used in this study. Simulation results show that the positive jet looks like a bullet, but the negative jet looks like a sword and more diffusive. The electric field in the positive jet head is much higher than the negative one, but it is reversed in plasma channel. The velocity of the negative jet in the tube is higher than the positive one, but out of the tube, the velocity of positive jet becomes higher than the negative one. The primary reactive species densities in negative jet are higher than those in positive one. The dominant physics associated with the formation and propagation of positive and negative plasma jets are analyzed. In addition, the behaviors of the second discharge at the falling edge of the voltage pulse in the both polarity plasma jet

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