

Plasma Generation and Chemistry of Reactive Nitrogen Species for Agricultural Applications

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Nitrogen-containing molecular species are essential nutrient for plants and can play eminent roles in physiological plant processes. Therefore, generation and chemistry of reactive nitrogen species (RNS), composing the nitrogen-containing molecular, can be potential key factors for its agricultural applications. A global modeling of the gas phase RNS chemistry highlights potential of upregulating nitrogen dissociation through the nitrogen vibrational excitation. The applied electric field control and the gas phase chemistry control are found experimentally effective for selective nitrogen vibrational excitation and the selective dinitrogen-pentoxide (N_2O_5) generation, an RNS in the gas phase, respectively. The N_2O_5 liquid interface reactions with organic compounds, their effects on virus inactivation and plant pathogenic fungus will also be discussed.