

Abstract Submitted  
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**Generation of stable centimeter-scale glow discharge in presence of external gas flow.**<sup>1</sup> VLADISLAV GAMALEEV, NIKOLAI BRITUN, MASARU HORI, Center for Low-temperature Plasma Science, Nagoya University, HORI-ISHIKAWA LABORATORY TEAM — Growing demands in nitric compounds and environmental concerns are leading to requirement of replacement of commonly used Haber-Bosh process by new methods. Nitrogen fixation by plasma looks promising as a “green” method for production of nitric compounds; however, some open questions (such as ineffective electric power use) still remain. In this work we propose method of generation of stable centimeter-scale re-pulsing glow discharge in ambient air, which will improve efficiency of electric power use during plasma treatment. Re-pulsing glow discharges were characterized by current and voltage measurements, and optical emission spectrometry. It was found that, at a certain range of parameters, the discharge could be stabilized even in the presence of external gas flow. It was confirmed that by using pulse-width modulation with gas-flow control, rotational and vibrational temperatures could be varied across a wide range. The generation of stable glow discharge in the presence of gas flow with a wide range of parameters that could be precisely controlled by pulse-width modulation looks promising for use in energy-efficient gas conversion. In the presentation, plasma generation process, electrical parameters of the plasma and results of optical diagnostics will be demonstrated.

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