

Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

Floating-wire-assisted remote generation of high-density atmospheric pressure inductively coupled plasma THI-THUY-NGA NGUYEN, Institute of Innovation for Future Society, Nagoya University, Japan, MINORU SASAKI, Toyota Technological Institute, Japan, HIDEFUMI ODAKA, Asahi Glass Company, Ltd., Japan, TAKAYOSHI TSUTSUMI, KENJI ISHIKAWA, MASARU HORI, Nagoya University, Japan, NAGOYA UNIVESITY, JAPAN TEAM, TOYOTA TECHNOLOGICAL INSTITUTE, JAPAN COLLABORATION, ASAHI GLASS COMPANY, LTD., JAPAN COLLABORATION — Atmospheric pressure plasma (APP) has been intensively studied due to the miniaturization of equipment size and the reduction of energy consumption. Among the APP sources, the inductively coupled plasma (ICP) sources are potentially used for high-density plasma generation. Without an additional external power supply, the ICP has difficulty in igniting discharges at atmospheric pressure. By placing a long floating wire inside the power source, the plasma can ignite easily and extend to a remote region. Here we report an atmospheric pressure inductively coupled plasma source that is designed by a 200-mm-high quartz tube with a long floating wire placed inside and a three-turn copper coil. When 100 W of a very high frequency power was applied, a large-area plasma with an electron density of 10^{14} cm^{-3} and a low gas temperature less than 850 K was remotely generated at downstream region where was 140 mm far from the coil region center, and the plasma discharge was more than 170 mm in length. This APP source could be developed to produce a high-density plasma for high-rate and large-scale etching applications.

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Date submitted: 15 Jun 2018

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