

Abstract Submitted  
for the GEC17 Meeting of  
The American Physical Society

**Development of atmospheric high-speed jet pulsed plasma source for high-speed surface treatment** DAISUKE OGASAWARA, HIROAKI KAWANO, HIDEKAZU MIYAHARA, FIRST, Tokyo Institute of Technology, CHI-AKI SATO, MSL, Tokyo Institute of Technology, AKITOSHI OKINO, FIRST, Tokyo Institute of Technology — In recent years, atmospheric non-thermal plasmas have been widely used for surface treatment such as pretreatment for adhesion strengthening. However, in conventional remote plasma sources, many reactive species lose the surface treatment effect before they arrive to the target surface because they have short lifetime. For this reason, usual plasma sources could give the effect in short-distance of about several mm, and they have limitation in processing speed. To solve this problem, we developed an atmospheric high-speed jet pulsed plasma source. In this source, high-density plasma generated in continuous low gas flow is irradiated by high-speed short-pulsed gas flow and so reactive species arrive to the remote surface in a short time. In the experiment, a high-pressure gas valve of 0.5 MPa was opened for 0.1 s to generate the high-speed gas flow. Nitrogen plasma pulsed jet was irradiated once per second at 5 mm of working distance. The plasma gas velocity was measured by Schlieren method and the surface treatment effect was evaluated by water contact angle. Consequently, the maximum gas velocity was 490 m/s (Mach 1.4) and the hydrophilization speed had improved to twice compared to our conventional plasma source.

Daisuke Ogasawara  
FIRST, Tokyo Institute of Technology

Date submitted: 31 May 2017

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