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Microscopic observation of an atmospheric-pressure microwave plasma produced in a meter-scale slot with sub-millimeter gap HIRO-TAKA TOYODA, HIROTSUGU KOMA, YOSHIKI BABA, MANH HUNG CHU, HANSIN BAE, HARUKA SUZUKI, Nagoya University — In recent years, techniques for applying non-thermal equilibrium atmospheric-pressure plasma to large surface treatment have been given much attention. Microwave atmospheric-pressure plasma sources are promising because they can produce high-density plasma easily. We developed a microwave plasma source to control the propagation direction of the electromagnetic waves in the waveguide in one direction to suppress standing wave and succeeded in producing atmospheric pressure plasma in the meter-scale slot with a slot gap of $<0.2\text{mm}$. In this study, the detailed structure of the plasma inside the slot and its spatial distribution in the longitudinal direction is investigated by operating the microscope parallel to the slot. Strong emission in the vicinity of the slot edge is observed and this is presumably caused due to spatial variation of the gas density and the plasma density across the slot gap. The emission structure is observed in the longitudinal direction and very uniform emission structure is observed in the longitudinal length of 60 cm. In the presentation, very fast and uniform surface treatment will be also demonstrated.

HirotaKa Toyoda
Nagoya University

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