

Oral presentation | 8 Plasma Electronics : 8.7 Plasma Electronics Invited Talk

📅 Mon. Sep 16, 2024 10:00 AM - 11:30 AM JST | Mon. Sep 16, 2024 1:00 AM - 2:30 AM UTC 🏢 A41 (TOKI MESSE 4F)

[16a-A41-1~2] 8.7 Plasma Electronics Invited Talk

Hiromasa Tanaka(Nagoya University)

🎤 English Presentation

10:00 AM - 10:45 AM JST | 1:00 AM - 1:45 AM UTC

[16a-A41-1]

[Invited Talk in the "Plasma Electronics" Session] Nonthermal Atmospheric Pressure Plasma and its Nitric oxide (NO) Water for Agriculture and Environmental Sciences

○Eun Ha Choi¹, Jinsung Choi¹, Youn June Hong¹, Ihn Han¹ (1.Plasma Bioscience Research Center, Kwangwoon Univ.)

🎤 English Presentation

10:45 AM - 11:30 AM JST | 1:45 AM - 2:30 AM UTC

[16a-A41-2]

[Invited Talk in the "Plasma Electronics" session] Utilizing Custom-built Plasma Sources for Natural Materials Processing

○Magdaleno Jr Vasquez¹ (1.University of the Philippines Diliman)

Nonthermal Atmospheric Pressure Plasma and its Nitric oxide (NO) Water for Agriculture and Environmental Sciences

Eun Ha Choi¹, Jinsung Choi¹, Youn June Hong¹, Ihn Han¹

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Demonstration project for plasma agriculture in Korea would be introduced for transfer to field site from laboratory scale. For this project the multicylinder dielectric barrier plasma source has been developed for the major production of NO, from which some of other ROS could be controlled and adjusted for the respective applications under low power consumption less than 150 W. Also the plasma characteristics of multicylinder dielectric barrier plasma source as well as its electrical properties will also be described for mutual understandings.

Especially the demonstration work for plasma agriculture at Yeon-Chon Agricultural Technical Center (ATC), Kyunggi Province, will be discussed with lettuce, strawberry, radish and cactus. Also many other farm field such as Yang-Pyong, I-Chon, Jin-Chon, Pyeong-Tack, and Hong-Chon counties are followed to participate to plasma agriculture by various vegetables and fruit plants as well as animal husbandry. Also odor removal issues from poultry, piggery, and cattle-shed farms would be emerging in many places for applications of nonthermal atmospheric pressure plasma to field sites in Korea.

Utilizing Custom-built Plasma Sources for Natural Materials Processing

University of the Philippines Diliman, Magdaleno R. Vasquez Jr.

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Plasma systems have been gaining considerable attention because of their potential uses in the processing of natural products. These systems are simple, inexpensive, easy to use, low maintenance, fast, and generally safe. In this talk, modular open system plasma devices were developed to treat different materials such as bamboo, cellulose, and carrageenan. Atmospheric and subatmospheric pressure plasma systems were assembled using custom-designed components and used to tailor the surface characteristics of materials for specific applications. For bamboo, the surface wettability can be tuned depending on the desired response. Plasma-induced hydrophilicity improved the adhesion strength of bamboo to polyvinyl acetate by up to 55%. Likewise, a plasma-based treatment improved the fire retardancy of hydrophobic bamboo by more than twice the ignition time of untreated bamboo. Plasma treatment was also used to modify the surfaces of cellulose and carrageenan powders to improve their dissolution and processability. Plasma-treated cellulose was easily dissolved in lithium chloride–dimethylacetamide. After being exposed to plasma, the carrageenan powders easily dissolved. These plasma processes can be used to improve miscibility. Plasma-induced compatibilization enabled the use of biomass-based products. The continuous development and advancement of versatile and reconfigurable plasma systems will improve surface processing technologies.