

CAMT Seminar

“Tuning the composition of plasma-activated water”

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Date: February 21, 2019 (Thu) 11:00-12:00

Location: Main Conference Room (1st floor), Bldg. A12

Center for Atomic and Molecular Technologies (CAMT)

(A12 棟 1 階会議室)

Abstract:

In the last decade plasma-activated water (PAW) has received a lot of attention from the plasma medicine and plasma agriculture community due to its potential to induce oxidative stress to cells. By PAW it is meant the water, which contains reactive species, mostly reactive oxygen and nitrogen species (RONS), generated by the interaction of active or afterglow plasma with water. The main long-lived RONS produced in PAW have been identified to be the H_2O_2 , NO_2^- and NO_3^- , whose lifetime has been defined to vary from couple of days to weeks. PAWs have been created typically in the amount of 0.1-30 ml, with the concentration of generated species decreasing with the volume of the treated water.

Usually the studies report one or two PAW conditions and do not give suggestions for the tuning of the PAW composition, which would be welcomed in order to be able to define the role of different species acting in synergy in the biological applications. For tuning the PAW composition an attempt has been done by Ito et al (Japanese Journal of Applied Physics 56, 01AC06 (2017)) by using a He DBD jet with different shielding gases obtaining ratios of $[\text{NO}_2^-]/[\text{H}_2\text{O}_2]$ ranging between 0 and 0.18. However, here no information is given about the density of NO_3^- molecules, which can be formed also during storage from the reaction of NO_2^- with H_2O_2 .

In our presentation we show the possibility of tuning the composition of PAW by using a surface wave microwave discharge, reaching species density ratios varying over 3 orders of magnitudes, depending on the treatment conditions.

(Host: Satoshi Hamaguchi Ext:7913)