7th International Conference on Advanced Plasma Technologies

24th February to 1st March 2019, Hue, Vietnam

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Program

Saturday, 23rd December

16:00	**Joint meeting of Scientific and Organization Committee**
19:30	**Dinner**

Sunday, 24th February

15:00	**Registration**
19:30	**Welcome cocktail and dinner**

Monday, 25th February

8:00	**Breakfast**
8:50	**Opening of the conference**
9:00	**Alexander Fridman (USA)**; Pulsed DBD and jets, physics and biomedical applications
9:20	**Antoine Rousseau (France)**; Plasma jets for skin repair
9:40	**Katsuhisa Kitano (Japan)**; Peroxynitric acid ($HOONO_2$) is the most valuable chemical species in plasma-treated water for effective and safe disinfection
10:00	**Cristina Canal (Spain)**; Biocompatible vehicles for RONS generated by atmospheric plasmas in liquids
10:20	**Milan Stefanović (Slovenia)**; Use of non-thermal plasma in human oncology
10:40	**Coffee break**
11:00	**Jin-Hyo Boo (Korea)**; Atmospheric plasma assisted synthesis of nano-oxide materials for bio-medical applications
11:20	**Vojko Flis (Slovenia)**; Technology behind endovascular treatment of aortic aneurysms
11:40	**Makoto Sekine (Japan)**; Synthesis of carbon nanomaterials employing in-liquid plasma
12:00	**Thierry Belmonte (France)**; From equilibrium to non-equilibrium alloy nanoparticles by discharges in liquids
12:20	**Jean-Francois Pierson (France);** Three strategies to improve the functional properties of copper oxide thin films
12:40	**Jean-Paul Booth (France);** Novel diagnostics to unravel fundamental processes in oxygen plasmas
13:00	**Lunch break**
14:20	**Timo Gans (UK)**; Controlled plasma dynamics and chemical kinetics in low temperature plasmas for environmental and healthcare technologies

Biocompatible vehicles for RONS generated by atmospheric plasmas in liquids

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Over the last few years, significant attention has been paid to biomedical applications of Atmospheric Pressure Plasmas (APP). Plasma chemistry leads to the generation of an abundance of reactive species (RONS) which are suspected to play a key role in selective cancer cell death without damaging surrounding healthy tissues. Such effects have also been observed in plasma activated liquids (PAM), opening the door for minimally invasive therapies. It is our aim to investigate the effects of different plasma jets in the generation of RONS in liquids of biological interest. However, injection of a liquid in the body associates it being washed away by the blood flow, so development of efficient vehicles, which allow location and delivery of RONS to the diseased site is lacking. Therefore, it is our interest to elucidate the potential of hydrogels to generate and store RONS generated by plasmas. Hydrogels are highly hydrated natural, synthetic or semi-synthetic networks of cross-linked polymer chains whose features such as biocompatibility make them great candidates for the design of advanced biomaterials.

Different hydrogels have been studied, and in general, their physic-chemical properties remain unchanged by the plasma treatment, while the hydrogel shows several-fold larger capacity for generation of RONS than a typical isotonic saline solution – the absolute amounts generated depending a lot on the chemistry of the hydrogel. The hydrogels show capacity for sustained release of the RONS. Despite the high amount of RONS generated, including peroxides, the biocompatibility, assessed through cytotoxicity assays, remained unchanged, opening the door for the use of hydrogel-based biomaterials in CAP-associated therapies. The biological effects of the treated liquids or hydrogels are investigated in different cell lines and discussed with regard to the different reactive species generated in the PAM (ie. $[H_2O_2]$, $[NO_2^-]$, short-lived RONS).

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