

論文 / 著書情報
Article / Book Information

Title	Low-temperature Plasma Source Capable of Generating Various Reactive Species and Irradiating Living Organisms
Authors	Taiki Osawa, Chishi Ryu, Kai Fukuchi, Yohei Fukuyama, Yuriko Matsumura, Atsuo Iwasawa, Akitoshi Okino
Citation	The 8th International Symposium on Metallomics, P-40
Pub. date	2022, 7

Low-temperature Plasma Source Capable of Generating Various Reactive Species and Irradiating Living Organisms



Taiki Osawa¹, Zhizhi Liu¹, Kai Fukuchi¹, Yohei Fukuyama¹,
Yuriko Matsumura², Atsuo Iwasawa², Akitoshi Okino¹

¹FIRST, Tokyo Institute of Technology, ²Tokyo Healthcare University

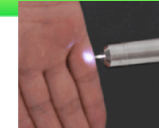
Mail: o-taiki@plasma.es.titech.ac.jp

1. Atmospheric Pressure Low-Temperature Plasma

At the beginning of this century, it became possible to generate low-temperature plasma under atmospheric pressure, attracting attention not only in the field of materials but also in the fields of medicine and life sciences.

- Low temperature
- Non-residual toxicity
- No discharge and thermal damage

✓ Safe plasma irradiation to living tissue and cells

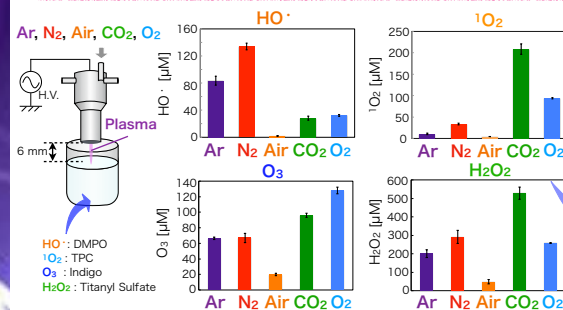


2. Measurement of Reactive Species in Plasma of Various Gas Types

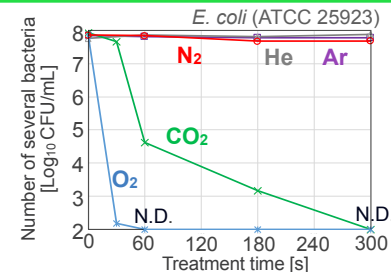


Plasma can be generated with various gas types

Capable of generating various reactive species



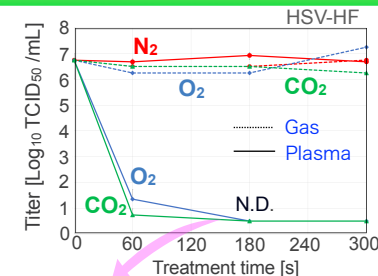
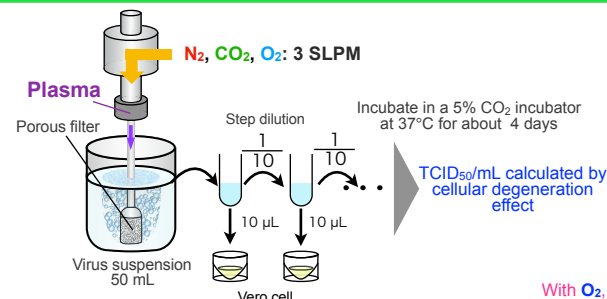
3. Disinfection Effect of Plasma Bubbling on *Escherichia coli*



- N₂, He, Ar plasma did not produce a disinfection effect
- Remarkable disinfection effect with O₂ and CO₂ plasma

¹O₂, O₃, H₂O₂ are contributed to disinfection?

4. Inactivation Effect of Plasma Bubbling on Herpes Simplex Virus



With O₂, CO₂ plasma, the titer of the virus decreased to almost zero after 180 seconds of treatment.

Similar results were obtained for *E. coli* disinfection.

Similar reactive species (¹O₂, O₃, H₂O₂) are thought to contribute to disinfection and viral inactivation.

5. Summary and Future Plans

- ✓ The reactive species produced in the plasma depended on the type of plasma gas.
- ✓ O₂ and CO₂ plasma showed remarkable bactericidal and virus inactivation effects.
- ✓ Similar reactive species were shown to possibly contribute to bactericidal and viral inactivation.
- Measurement of other reactive species
- Inactivation of non-enveloped virus by plasma bubbling