

NON-THERMAL PLASMA LABORATORY

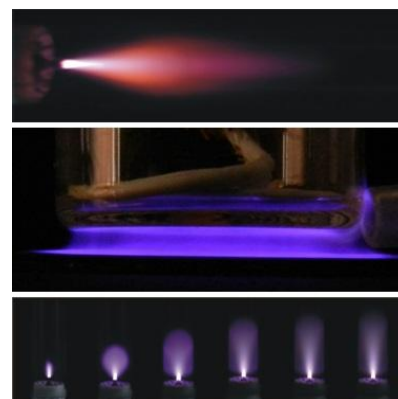
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ABOUT US

The non-thermal plasma laboratory was first established in the year 1992 under the auspices of the Physics Faculty, Babeş-Bolyai University. During the years, the research activity was varied, having as main objectives the development of non-thermal plasma sources (especially Dielectric Barrier Discharges and Plasma Jets), plasma diagnostics and several plasma applications like surface modifications, plasmas as spectral emission sources and bacterial inactivation. More recently, the research trends in the lab are based on plasma–liquid interactions. Applications like water activation, nanoparticles synthesis, colorant degradation and bacterial decontamination as a result of non-thermal plasma treatments on liquids are thoroughly studied.

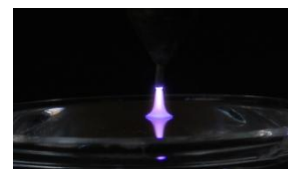
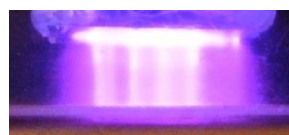


EQUIPMENT

- atmospheric pressure plasma generators (20-50 kHz, 800 kHz, 10 MHz; 2 – 40 W)
- UV and UV-Vis optical emission spectrometers (fiber optic)
- waveform generators, high voltage probes, current probes, spectrum analyzer

PLASMA SETUPS

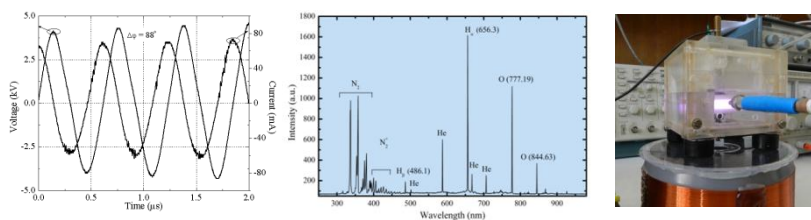
- DBDs
 - at atmospheric pressure
 - at low pressure
- Jets
- Micro jets
- Micro arcs
- Plasmas in contact with liquids



Discharge gases: He, Ar, air

PLASMA DIAGNOSTICS METHODS

- Electrical
- Optical



APPLICATIONS

- Surface treatments
- Bacterial decontamination
- Spectral source
- Colorant degradation
- Liquids activation
- Nanoparticle synthesis



THE TEAM

Coordinator: Professor Emeritus Dr. Sorin Dan Anghel
 PhD Students: Iulia-Elena Vlad
 Master Students: Emilia Muntean
 Bachelor Students: Cristiana Martin

RECENT PUBLICATIONS (2012 – 2016)

1. S. D. Anghel, I. E. Vlad, Characterization of a dielectric barrier discharge generated in open space with flowing working gas, *Roum. Journ. Phys.*, 61, 999-1008, 2016.
2. I. E. Vlad, C. D. Tudoran, S. D. Anghel*, *Adhesivity improving of PET by treatment in low pressure plasmas generated at 40 kHz and 1 MHz. Comparative study.*, *Rom. Rep. Phys.*, 68, 305-315, 2016.
3. D. Zaharie-Butucel, J. Papp, C. Leordean, S. D. Anghel, *Different ordering carbonaceous structures synthesized by bubbled Ar or He plasmas inside methylene blue solutions with contrasting Escherichia coli growth inhibition effects*, *RSC Advances*, 5, 98325-98334, 2015.

4. S. D. Anghel, D. Zaharie-Butucel, I. E. Vlad, *Single electrode Ar bubbled plasma source for methylene blue degradation and concurrent synthesis of carbon based nanoparticles*, J. Electrostat., 75, 63-71, 2015.
5. I. E. Vlad, O. T. Marisca, A. Vulpoi, S. Simon, N. Leopold and S. D. Anghel*, *Simple approach for gold nanoparticle synthesis using an Ar bubbled plasma setup*, J. Nanopart. Res., 16:2633, 2014.
6. D. Zaharie-Butucel and S.D. Anghel, *Optical characterization and application of an atmospheric pressure Ar plasma in contact with liquids for organic dye degradation*, Roum. Journ. Phys., 59, 757-766, 2014.
7. S.D. Anghel, *Atmospheric pressure plasma with a flat spiral electrode*, J. Electrostat, 71, 155-158, 2013.
8. J. Papp, I. Molnar, A. Simon and S.D. Anghel, *Deactivation of Streptococcus mutans biofilms on tooth surface using He dielectric barrier discharge at atmospheric pressure*, Plasma Sci. Technol., 15 (6) 535-541, 2013.
9. V.J. Law and S.D. Anghel, *Compact atmospheric pressure plasma self-resonant drive circuits*, J.Phys.D: Appl. Phys. 45, 075202, 2012.
10. F.T. O'Neill, B. Twomey, V.J. Law, V. Milosavljevic, M.G. Kong, S.D. Anghel and D.P. Dowling, *Generation of Active Species in a Large Atmospheric Pressure Plasma Jet*, IEEE Trans. Plasma Sci. 40, 2994-3002, 2012.
11. A. Simon, O.E. Dinu, M.A. Papiu, C. Tudoran, J. Papp and S.D. Anghel, *A study of 1.74 MHz atmospheric pressure dielectric barrier discharge for non-conventional treatments*, J. Electrostat, 70, 235-240, 2012 .
12. A. Simon, O.E. Dinu, M.A. Papiu, V. Simon, S. D. Anghel, H. Mocuta and J. Papp, *Comparative study on the structural properties of plasma treated bioglasses and composites*, Roum. Journ. Phys., 57, 1392-1402, 2012.
13. C. D. Tudoran, V. Surducan, A. Simon and S. D. Anghel, *High frequency inverter based atmospheric pressure plasma treatment system*, Roum. Journ. Phys., 57, 1382-1391, 2012.
14. A. Simon, O.E. Dinu, M.A. Papiu, C.D. Tudoran and S. D. Anghel, *Ageing behavior of HeDBD treated glass surface*, Roum. Journ. Phys., 57, 1367-1374, 2012.