

Electrical and Optical Characterization of Dielectric Barrier Discharge and its Application in Water Treatment

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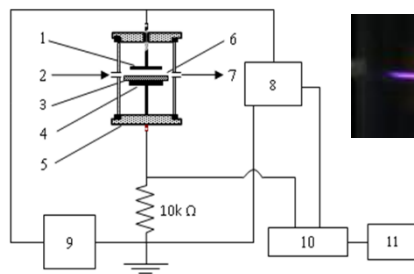
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This research work reports the results concerning the generation of Dielectric Barrier Discharge (DBD) and Atmospheric Pressure Glow Discharge (APGD) in different gases at atmospheric pressure and the study of its electrical and optical properties. The discharge has been produced by using three different power supplies. (i) High voltage (0-20 kV) AC source of frequency (10-30 kHz) (ii) High voltage (0-20 kV) AC source of frequency (20-50 kHz). Symmetric and asymmetric electrodes configurations such as hemispherical, parallel disc, rectangular parallel plate and cylindrical and annular are used in DBD and APGD chambers. Filamentary mode and homogeneous DBD mode of discharge were studied. The optical spectra in the range

of 200 nm to 850 nm has been analyzed in order to estimate the electron temperature and electron density by intensity ratio method. The work was to develop an annular electrode system in which water was directly passed through the DBD for ozone treatment. Results of ozone treatment of water samples collected from various sources showed a significant reduction in the number of coliform bacteria.

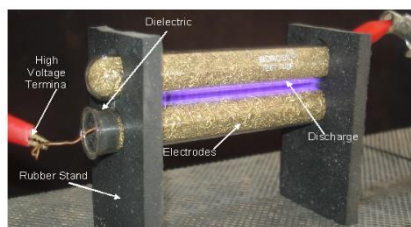
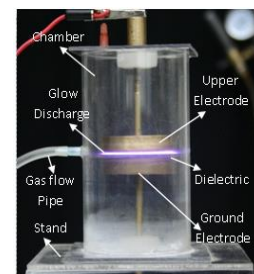
References

- [1] U Kogleschatz et al, Plasma Chem. Plasma Process., **23** (2003)
- [2] F Massines et al, J. Appl. Phys., **83** (1998)
- [3] N Balcon et al IOP Publishing Ltd. **16**, (2006)

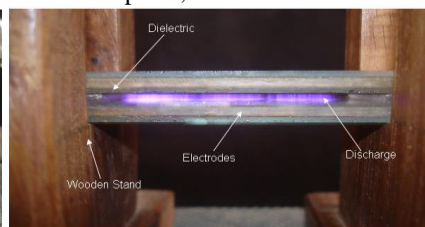


Glow Discharge using Argon Gas

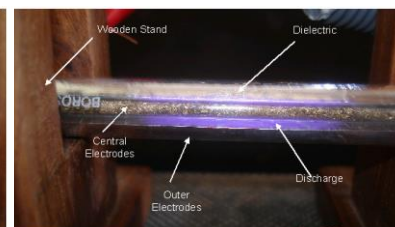
1-Circular parallel plate electrode, 2-Gas inlet, 3-Glass plate, 4-Grounded electrode, 5- Plasma reactor, 6-Discharge, 7- Gas outlet 8- Voltage probe, 9- Power supply (A.C), 10-sciloscope, 11-Computer,



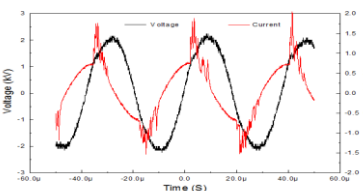
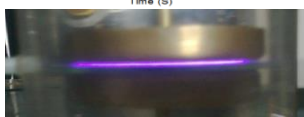
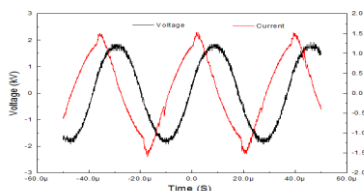
DBD in Cylindrical Electrode



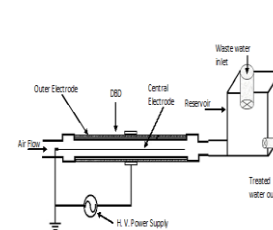
DBD in Parallel Plate Electrode



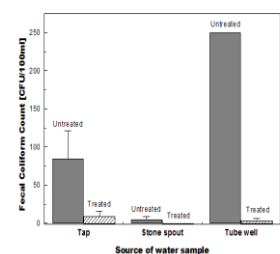
DBD in Annular Electrode



Voltage and current waveforms of the APGD produced with power supply operated at 26.5 kHz.



Ozone production using annular electrode system



Reduction of Fecal Coliform by DBD Treatment