

## **Study of the development of discharge of a DBD lamp under different pulse power supply**

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Ultraviolet (UV) sources have been investigated for many years by numerous of researchers [1]. However, in these few years, the application of the UV has become an essential technology in several industrial sectors involving electronics (plasma display), chemical reactions, multilayer techniques and medical treatments (water and skin treatment), etc. In fact that, for these applications, the important thing is the energy efficiency. The efficiency depends on pressure of gas mixture, temperature as well as the structure of discharge and also the power supply. The main purpose of our work is to investigate the generation of exciplexes emission in mixtures of Xenon with Chlorine using Dielectric Barrier Discharges (DBD) at an optimal pressure and under different power supply. In this paper, we concentrate on studying the development of discharge as well as the structure of discharge of a DBD lamp when dealing with the changing of frequency of each power supply.

In our experiments, the gas mixture of Xenon and Chlorine is fixed at about 160mbar, the frequency is changed in the range of 60 kHz to 200 kHz for pulsed voltage, and 50 kHz to 80 kHz for pulsed current. All acquisitions of the time resolved imaging of discharge by the excilamp are recorded by the help of camera ICCD in 2 following cases: with or without of filter UV at 308nm. This filter is only exceeded by the ultraviolet at 308nm.

From the obtained results, they show us the different discharge mode when changing the frequency of each power supply. At low frequency for each power supply in all 2 cases (with or without filter UV), we got more filament discharge than at high frequency; it means that the efficiency of UV emission by a DBD lamp is improved. On the basis of comparison of these efficiencies we will choose the best power supply for a DBD lamp on the production of UV source.

### **References**

1. Jun-Ying Zhang and Ian W.Boyd,“UV Emission of Excimer XeCl\* Excited in Dielectric Barrier Discharge by using Pulse Power Supply”, Appl.Phys.80 (2), 1996