

电机电工

## 移相控制串联谐振式臭氧发生器电源分析

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摘要

对工作在一种移相控制下的串联负载谐振式全桥逆变器供电的介质阻挡放电(DBD)型臭氧发生器的供电电源进行详细的分析, 通过结合逆变桥中开关器件的通断状况和DBD电路的放电、未放电状态, 得出了DBD电路的供电电源在移相控制下的2种不同点火状况及其在不同点火状况下的电路工作模式。在模式分析的基础上, 推导供电电源的工作频率、DBD电路承受的峰值电压、逆变电路输出电流峰值和电路放电功率的显性表达式, 并通过这些公式对这4个主要参数的调节特性进行分析。最后给出理论计算和实验结果的对比分析, 验证利用模式分析方法分析DBD电路的可行性以及理论推导的正确性。

关键词 [移相控制](#) [串联谐振](#) [介质阻挡放电电路](#) [模式分析](#)

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## Research on DBD-type Ozonier Powered by Series Resonant Inverter With Phase Shifting Control

Abstract

The dielectric barrier discharge(DBD)-type ozonier powered by full bridges series resonant inverter with phase shifting control was studied. By analyzing the on-off conditions of the power switches and the states of discharge and non-discharge in DBD circuit, the working modes of power supply were achieved and the equations describing these modes was deduced. Based on these equations, the expressions of working frequency of power supply, peak voltage of DBD circuit, peak current of inverter and discharging power of DBD circuit were made. By these expressions, the regulating characteristics of the four former parameters were made. Finally, the results of theory calculation and experimental results were compared, which prove that the DBD circuit power by resonant inverter can be analyzed in mode analysis and the expressions can be validated by experiments.

Key words [phase shifting control](#) [series-resonant](#) [dielectric barrier discharge circuit](#) [modes analysis](#)

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