

APPLICATION OF RESONANT CONVERTER IN OZONE GENERATOR MODEL

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Abstract

Ozone is one of the favorable oxidant to use in home appliance and industry as disinfectant for food processing, food storage, odor abatement, groundwater remediation, and drinking water purification. The common and previous technical method for generating ozone uses a high voltage and low frequency. This kind of method has disadvantage of energy efficiency, size and weight. This paper proposed the use power electronics in the inverter resonant circuit to produce alternating current with high frequency. The basic RLC resonance circuit is used for early study to determine resonance frequency for inverter. As the result, the ozone chamber terminal voltage had been achieved for initiation by using resonance frequency.

Keywords: power electronics, inverter, resonant converter, ozone generation

1. INTRODUCTION

Nowadays, ozone is becoming the oxidant of choice for many air and water applications. Ozone is widely used in industrial and domestic applications as the oxidant element for bleaching and disinfecting. It is also used in food processing, food storage, odor abatement, groundwater remediation, and drinking water purification. The application of ozone is a rapidly growing field in which the improvement in the ozone generation systems is a key issue. The best industrial method known today to generate ozone is the use of electric discharges. This technique has been investigated for a long time by many researches [1-4], but much progress is still to be done to increase the overall efficiency of existing reactors. A first possibility to increase the efficiency is the use of high frequency converters to supply the ozonizer, as opposed to the low frequency power supplies used traditionally[5]. High frequency converters provide lower power losses, lower size and weight and the possibility to control the amount of ozone generated [5].

The basic configuration of ozone generation is shown in Figure .1. The principle of operation of OG consists to apply a high voltage between two parallel plaques with air inside, the high voltage produces the phenomenon know as silent discharge or corona effect. The silent discharge produces ultraviolet radiations that break the oxygen molecule producing ozone. It is important to avoid the arc discharge to maintain the silent discharge, which is obtained adding a dielectric between the air gap and one of the electrodes [6-7,10].

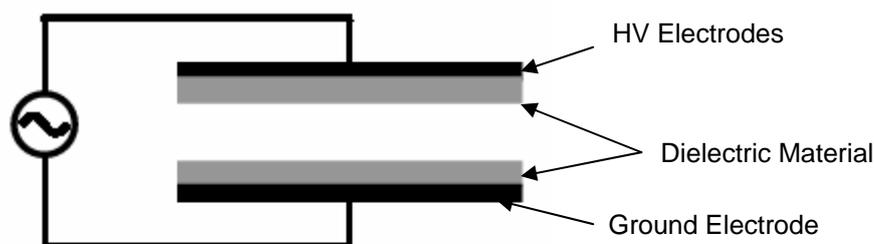


Figure.1 The basic configuration of ozone generation