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# Characteristics of nanosecond pulsed discharge type ozonizer with a tube to cylinder reactor

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Ozone characteristics such as strong oxidation power and no-residual toxicity makes it highly expected as a next-generation oxidant. Ozone has been used mainly in clarification of drinking water and industrial wastewater treatments. In recent years, ozone generation by pulsed power technique has been studied. In our laboratory, nanosecond (ns) pulse generator which produces non-thermal plasma has been developed to generate ozone. It has been demonstrated that ns pulsed discharge is effective for high efficiency ozone generation. However, there is still a problem that the maximum ozone concentration saturates at approximately 40 g/m3. The ozone concentration required for water purification application is typically 100 –120 g/m3. Therefore, improvement of ozone concentration using ns discharge method is necessary. It is assumed that one of the main cause of ozone concentration saturation is ozone thermal decomposition due to gas temperature rise. In our previous studies, gas temperature rise was observed in the vicinity of the high voltage applied wire electrode in a wire to cylinder electrode geometry. Therefore, a new electrode has been developed in the present study by employing a tube to cylinder electrode geometry. Thus, the high voltage applied tube electrode enables to pass through cooling medium inside of the tube. Characteristics of ozone generation using the tube to cylinder electrode will be presented in this paper. Furthermore, the effect of helium gas addition to the seeding gas is investigated. As a result, it was deduced that tube to cylinder electrode system and helium gas addition are effective for increasing ozone concentration.

**Author:** HIDAKA, Hiroki (Graduate School of Science and Technology, Kumamoto University –Japan)

**Co-authors:** Mr IKOMA, Daichi (Graduate School of Science and Technology, Kumamoto University –Japan); Mr SASAKI, Kanji (Graduate School of Science and Technology, Kumamoto University –Japan); Prof. WANG, Douyan (Institute of Pulsed Power Science, Kumamoto University –Japan); Prof. NAMIHIRA, Takao (Institute of Pulsed Power Science, Kumamoto University –Japan)

**Presenter:** HIDAKA, Hiroki (Graduate School of Science and Technology, Kumamoto University –Japan)

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