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Influence of Density of Ozone and Plasma on OH Radical Generation

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We have studied the water purification by pulsed discharge in atmospheric gas including water droplets. The water purification is caused due to decomposition of organic compounds in water by OH radical generated in the pulsed discharge space.
Although there are many reaction path from plasma generation to OH radical reaction with an organic compound, it is not known which path is dominant. To aim to know it, OH radical was measured, setting density of ozone and plasma as parameter. The pulsed discharge plasma was generated in mix gas of argon and oxygen. Ozone was produced by the pulsed discharge in the reactor and supplied from ozonizer. To control ozone density in the reactor, the ratio of argon and oxygen in the reactor and the amount of supplied ozone were adjusted, with feeding back measured ozone concentration. To control plasma density, peak, width, and repletion ratio of pulsed voltage applied at electrode in the reactor were varied using a solid state compact linear transformer driver (LTD). OH radical was measured by fluorescence method using the disodium salt of terephthalic acid.
The result showed that the amount of OH radical depended on ozone density. Therefore, the reaction path including ozone is one of dominant path which occurs from plasma generation to OH radical reaction with an organic compound. Additionally, synergistic effect by plasma is also discussed in our presentation.

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