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Decomposition Mechanism of Organic Compounds in Water Plasma under Atmospheric Pressure NARENGERILE, TAKAYUKI WATANABE, Tokyo Institute of Technology — Decomposition of aqueous acetone or glycerin was performed by water plasmas generated by DC discharge at atmospheric pressure. Both of acetone and glycerin were thermally decomposed by the water plasma, and then H2, CO, CO2, and CH4 were generated as the major products in the effluent gas. For the acetone decomposition, the decomposition rate was reached as high as 99.7%, and 80% of the fed carbon in acetone was transformed into solid carbon at 5mol% of the injected solution. In contrast, the solid carbon formation from glycerin at 5mol% of the injected solution was negligible. This results indicated that the different decomposition mechanism between acetone and glycerin in the water plasma. The decomposition mechanisms were investigated from the comparative study on the acetone and glycerin decomposition on the basis of the experimental results and kinetics consideration. The incomplete oxidation of acetone in the water plasma leads to the C2H2 formation as the by-product and the large amount of solid carbon formation, while glycerin was completely decomposed even at high concentration. The complete decomposition of glycerin indicated that OH radical enhanced the oxidation of organic intermediate products.

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