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Mass Spectroscopic Study of Microorganisms Inactivation by N_2/O_2 Surface-wave Plasma YING ZHAO, AKIRA TSUKASAKI, AKIHISA OGINO, MASAAKI NAGATSU, Shizuoka University — Sterilization mechanisms have been studied to establish the low temperature plasma sterilization method. At the present, although there have a lot of investigation on sterilization mechanisms of low temperature plasma, there are no clear explanations as to the respective contributions of the various agents emanating from plasma to the bacterial killing process. In this work, we investigated the effect of etching process due to oxygen radicals on the inactivation of microorganisms in N_2/O_2 mixture plasma. The quadrupole mass spectroscopy(QMS) was used to study the etching process and etching bi-products of microorganism during plasma treatment. 30 samples of *Geobacillus stearothermophilus* with a population of $1.7x10^6$ pasted on each small stainless steel disc were exposed to N_2/O_2 mixture plasma. The ion current signals of H_2O and CO_2 molecules were observed obviously using the multiple ion detection measurement of QMS. These results indicated that hydrogen and carbon composites existing inside the microorganisms were ultimately converted into H_2O and CO_2 via the etching process by the reactive oxygen radicals.

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