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Spores of bacteria treated in dusty plasmas KAZUO TAKAHASHI, HIROTO TANAKA, RUI TOGASHI, EIGO ITO, Kyoto Institute of Technology, GAETAN HERRY, Polytech Orleans, University of Orleans, MARIE HENAULT, LAIFA BOUFENDI, GREMI, University of Orleans — Treating bacteria in plasmas has been focused attention on for this decade from the point of view of developing new sterilization methods in medical and food industries. Regarding the bacteria as small particles, combination of the bacteria and the plasmas leads to a new form of the dusty plasma, which contains electron, ion and massive small particles. This new form is expected to open new applications with help from understanding physics of dusty plasmas. In this study, we observed spores of bacteria injected to a discharge plasma. The plasma was generated by an rf (13.56 MHz) voltage with parallel-plate electrodes. The spores of a kind of bacteria, *Bacillus subtilis* were levitated in the plasma. It looked like the same as a dusty plasma. The spores were treated on the electrode as well as in the plasma. They were collected after treatment on the surface or in the gas phase. Survival rate of the bacteria treated in the gas phase was found to be lower than that on the surface. The spores on the surface were irradiated by ions through the Bohm sheath. Conversely, those in the gas phase were exposed to the ion flux expressed by the orbit-motion-limited (OML) theory. The ion flux of the OML sheath much larger than the Bohm sheath contributed to efficiently kill the bacteria.

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