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Application of Surface Micro-Discharge plasma to spacecraft component decontamination[1] SATOSHI SHIMIZU, Max-Planck-Institut für extraterrestrische Physik, SIMON BARCZYK, PETRA RETTBERG, Deutsches Zentrum für Luft- und Raumfahrt e.V. Institut für Luft- und Raumfahrtmedizin, TETSUJI SHIMIZU, TOBIAS KLAEMPFL, JULIA ZIMMERMANN, Max-Planck-Institut für extraterrestrische Physik, PETER WEBER, Deutsches Zentrum für Luft- und Raumfahrt e.V., Raumfahrtmanagement, GREGOR MORFILL, HUBERTUS THOMAS, Max-Planck-Institut für extraterrestrische Physik — In the field of extinct or extant extraterrestrial life research on other planets and moons, the prevention of biological contamination through spaceprobes is one of the most important requirements, and its detailed conditions are defined by the COSPAR planetary protection policy. Currently, a dry heat microbial reduction (DHMR) method is the only applicable way to satisfy the demand, which could, however, damage the sophisticated components like integrated circuits. In this study, cold atmospheric plasma based on the Surface Micro-Discharge technology was investigated for inactivation of different types of bacteria and endospores as an alternative method. After 90 min of plasma gas exposure, 3-6 log reductions were observed for the vegetative bacteria *Escherichia coli* and *Deinococcus radiodurans* and several types of bacterial endospores - including *Bacillus atrophaeus*, *B. safensis, B. megaterium, B. megaterium 2c1* and *B. thuringiensis E24*. Furthermore, the applicability of the system for spacecraft decontamination was checked by studying the inactivation homogeneity, the temperature at the area of interest and the effects of the plasma gas exposure on different materials.

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