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Reduced-pressure (∼1 torr) argon discharges for sterilization: influence of the type of materials subjected to the discharge PIERRE LEVIF, JACYNTHE SEGUIN, MICHEL MOISAN, JEAN BARBEAU, GROUPE DE PHYSIQUE DES PLASMAS, UNIVERSITY OF MONTREAL TEAM — Noble gases, as argon, for sterilization purposes in plasma discharges at reduced pressure, is very promising. As compared to molecular discharges (N_2), absorbed power density in argon is relatively low, which allows processing thermally-sensitive materials through plasma immersion. Noble gases discharges for sterilization purposes is safe for operator: no toxic residues, therefore no need to vent medical devices processed, in contrast to low-temperature chemical sterilization. The system designed to generate adequate reduced-pressure argon plasma sterilizer is described. Results of effects of nature of substrates subjected to argon discharge are analyzed through optical emission spectroscopy. The discharge spectrum in empty chamber is similar to that obtained when adding metal and glass substrates. In contrast, presence of polymers strongly modifies the spectrum. Influence of this "contamination effect" of gaseous phase on inactivation efficiency of exposed bacterial spores is examined through survival curves of microorganisms. Our results bring new insight into time evolution of inactivation mechanisms when different materials are being subjected to argon discharge for sterilization purposes.

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