

Plasma sterilization at normal atmospheric pressure-comparison of working gas and organic loading effect in medical applications

Abstract

This article describes a study on the sterilization and high level disinfection using plasma oxidation and dehydrogenation process in high frequency glow discharge and an experimental comparison of an inductive energy storage pulse power source, from the view point of alternative method for ethylene oxide chemical disinfection process. Antibacterial effect of the pulse-excited atmospheric pressure discharge is compared in He/O₂, He/N₂ and atmospheric pressure nitrogen streamer plasma. Optimum mixture ratio of nitrogen and oxygen was studied in microwave plasma, 2.45 GHz at the reduced pressure 50 to 100 Pa. In He - N₂ - O₂ mixture gas based on the synergistic effect of oxygen radical and UV radiation and the performance of the antibacterial effect was demonstrated with biological indicators: *Bacillus atrophaeus* ATCC 9372 and *Geobacillus stearothermophilus* ATCC 7953.

Keywords — Sterilization, atmospheric pressure, antibacterial effect, plasma oxidation