Method to create Self-Sterilizing Devices using Plasma Energy

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Technology description

Maintains a Constant Rate of Sterilization When Built Into Medical Devices and Surfaces

This self-generated plasma field provides for self-sterilization of devices used in medical procedures, drug delivery, consumer products, and food preparation and to surfaces, affording them self-sterilizing properties. It is estimated that 76 million illnesses, 325,000 hospitalizations, and 5,200 deaths occur in the United States each year due to some form of contamination, according to the Centers for Disease Control and Prevention. Researchers at the University of Florida have developed a sterilization technique that enables medical devices to maintain a constant state of sterilization for fast, economical, and safe reuse or disposal. Building into a device itself, the self-sterilization could potentially apply to numerous medical devices such as scalpels, syringes, and catheters, as well as various surfaces that come into contact with patients and healthcare workers.

Technology

This self-generated plasma field allows self-sterilization of objects, apparatuses, and surfaces. Traditionally, plasma discharge involves placing a DC voltage potential across two electrodes. As the voltage potential gradually increases, upon reaching the breakdown voltage VB, the current and the amount of excitation of the neutral gas becomes large enough to produce visible plasma. Dielectric barrier discharge (DBD) involves one dielectric-coated electrode that is typically exposed at the surface to the surrounding atmosphere, while another electrode is embedded inside a layer of insulator. University of Florida researchers have found that with special DBD arrangements, a fast reduction of viable cells by more than four orders of magnitude is possible within a few seconds, even for UV resistant cells. Thus, a self-generating plasma field is able to maintain a constant rate of sterilization when built into medical devices and surfaces.

Application area

Technique that affords self-sterilizing properties to medical devices as well as equipment or surfaces that require a constant state of sterilization for medical procedures, drug delivery, consumer products, or food preparation equipment

Advantages

Neutralizes contamination in seconds using a self-generated plasma field, minimizing risk of exposure and offering the highest levels of sterility
Allows reuse of devices and equipment, reducing costs, time, and inventory
Utilizes inexpensive electrodes, insulators, and electro-active components, ensuring easy and cost-efficient manufacturing
Eliminates the need for toxic chemicals used in traditional sterilization procedures, reducing potential exposure and related hazards
Applies to surfaces of various shapes and sizes, providing device-specific flexibility

Institution

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