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PRESS RELEASE

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Gentle sterilization of 3D components

The Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP, a provider of research and development services using low-energy electron beams, will present research results about its novel sterilization process for complex geometries at XPOMET 2018 in Leipzig from March 21 to 23, 2018.

As a result of increasingly innovative processes in additive manufacturing, individualized patient-specific medical products such as hip prostheses are meanwhile in use. In the future, sensors within these implants will provide information that can make further operations unnecessary. The advantages for the patient are obvious: the product is tailor-made and should be well-tolerated by the body. However, these products must first be sterilized for this purpose.

Scientists at Fraunhofer FEP have now developed a sterilization process for 3D components. The components are treated with low-energy electrons that reliably and gently sterilize the surfaces. With the help of a robotic arm and adapted software control, electron beam sterilization can now also be used for more complex products. Up to now, this has been difficult because low-energy electron beam technology only treats the surface. For example, the 3D robotic arm can now be used as well to safely and reliably sterilize extremely rough surfaces, cavities, and even complex screw threads.

Dr. Jessy Schönfelder, head of the Medical and Biotechnology Applications department at Fraunhofer FEP, explains: "New medical technology developments are becoming increasingly complex, meeting numerous demands for comfort, longevity and wishes of patients. Novel materials and components with integrated electronics and memory chips are increasingly being used in these applications. It is not possible to sterilize these components using conventional methods such as hot steam or ethylene oxide. The materials would change as a result and components would lose their functionality. Low-energy electron beams can be used to deal with these problems."

Electron beam sterilization can be performed directly through hermetically sealed packaging. It can even be incorporated into in-line equipment and can therefore be easily integrated into the production process. Thanks to the 3D robotic arm's ability to handle complex components, product-specific handling of medical devices is now possible.

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Electron beam sterilization is particularly suitable for sensitive materials such as polymers, biological tissue, and protein coatings that would not withstand conventional sterilization processes. Furthermore, the process is well-suited for electronics, microchips, and battery systems: functionality remains intact and information stored in microchips, for example, is not corrupted.

Together with industrial partners, scientists are developing product-specific handling sequences for 3D electron beam sterilization. They advise the customer during this development, from feasibility study to biological and technical testing of the product, right through to the design and integration of production equipment into existing process chains. Solutions for sterile packaging and process monitoring can also be offered based on successfully completed R&D projects.

In order to gain an even better understanding of hygiene requirements and to offer further innovative sterilization, inactivation, and cleaning solutions (including the use of innovative electron beam techniques) as well as the associated detection and analysis methods, the scientists would like to enter into discussions with representatives from industry, science, governmental agencies, and users. Interdisciplinary cooperation is urgently needed with all the above-mentioned sectors that can take into account the entire chain of hygiene-relevant processes, activities, and interfaces in optimizing this complex network. Cutting-edge research in individual areas of hygiene processes alone is not enough to provide reliable, affordable, and practical hygiene. A think tank organized by the Fraunhofer FEP will be held at XPOMET on this topic.

Fraunhofer FEP at XPOMET 2018:

Exhibition booth: in the FUTURE HOSPITAL exhibition area

Lectures: Day 3, March 23rd, 2018: Amazing technology:
- Eye-controlled interactive data glasses for diagnostics and therapy,
  Dr. Uwe Vogel, Deputy Director of Fraunhofer FEP

Think Tank: March 21, 2018, 2 p.m. - 5 p.m., on the topic of
RELIABLE HYGIENE – A CHALLENGE IN ALL AREAS OF MEDICINE

with prominent panel participants from the world of hygiene who will discuss what challenges and priorities need to be addressed in the future,

http://xpomet.com/de/future-hospital

Registration: Please send us an email with your complete contact details (last name, first name, company, email address) to *marketing@fep.fraunhofer.de*.
We will contact you.

Sterilization of an implant screw using electron beam technology and 3D handling
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