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Development of an innovative low temperature DBD plasma source based on a flexible textile layer for medical applications J.-S. BAUDLER, S. HORN, A. QUADE, K.-D. WELTMANN, INP Greifswald e.V. — Plasma sources for medical applications are usually expensive and inconvenient due to big dimensions or the need for special infrastructure. Our approach is to design a plasma source which will not only solve these problems, so it can also be mass produced at comparatively small costs. In this presentation we will show a short overview about the whole development process of such a device. We will start with the idea, including CAD, electric field simulation and proof of concept. Afterwards we will proceed to the prototype design and manufacturing including material choice, electrical control and conducting the first antimicrobial tests. The most important role during the development was the choice of materials for the dielectric barrier. The barrier is responsible for several important factors like required voltage, system capacity and user security. We will show that the class of fluoropolymers is one of the best choices here, but with the risk of harmful degradation products. Due to medical restrictions we had to look after these products with the widely used PTFE in mind. To estimate this risk we have used VUV-Spectroscopy to look in-vivo after the creation of the ArF excimer as a relative indicator for the degradation processes. When we observed this indicator we searched for ways to lower the risk. We ended up with two possible solutions: the defluorisation of the surface and lowering the overall system energy by electrode design. We compared both with our initial results to estimate the effectiveness of the methods.

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