**Calculation of Ion Energy Distribution Functions at the Inner Surface of a Pet Bottle During Sterilization Processes**[1] DANIEL SZEREMLEY, SIMON STEVES, RALF PETER BRINKMANN, PETER AWAKOWICZ, Ruhr-University Bochum, MARK J. KUSHNER, University of Michigan, THOMAS MUSSENBROCK, Ruhr-University Bochum —

Due to a growing demand for bottles made of polyethylene terephthalate (PET) fast and efficient sterilization processes as well as barrier coating to decrease gas permeation are required. Plasma sterilization is an alternative way of sterilizing PET without using toxic ingredients (e.g. hydrogen peroxide or peracetic acid). To allow investigations in the field of plasma sterilization of PET bottles, a microwave plasma reactor has been developed. A coaxial waveguide combined with a gas-inlet, a modified plasmaline, is used for both coupling the microwave power and injecting the gas mixture into the bottle. One key parameter in the context of plasma treatment of bottles is the ion energy distribution function (IEDF) at the inner surface of the bottle. Additional it is possible to apply a DC bias potential to a metal cage which is placed around the bottle. Numerical results for IEDFs performed by means of the Hybrid Plasma Equipment Model (HPEM) are presented. Plasmas with relevant gas mixtures (Ar and $ArO_2$) at different pressures and input powers are examined. The numerical results are compared with experimentally obtained data and show very good agreement.

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