Abstract Submitted
for the GEC20 Meeting of
The American Physical Society

Fast optical and electrical measurements at a single microdischarge setup during plasma electrolytic oxidation (PEO)[1] ANNA LENA SCHOENE, VERA BRACHT, PATRICK HERMANNS, PETER AWAKOWICZ, Institute of Electrical Engineering and Plasma Technology, Ruhr University Bochum
— Plasma electrolytic oxidation (PEO) is a process for the passivation of lightweight metals like aluminum. During this process, short-living microdischarges occur stochastically distributed on the substrate surface. To understand the individual behaviour of these microdischarges, a single microdischarge setup with an aluminum wire anode of 1 mm diameter employed. The wire is surrounded by an isolating cladding to reduce the active metal surface to the front tip of the wire. As electrolyte, a solution of potassium hydroxide (KOH) in destilled water (1 g/l) is used. The small active surface area enables optical and electrical measurements of single microdischarges. Time-resolved shadowgraphy and fast optical measurements with a quad ICCD camera and an Echelle spectrometer are carried out for a better understanding of the development and evolution of single microdischarges. The different life time stages of the microdischarges can be observed by triggering on the microdischarge current and delaying the measurements within the microdischarge lifetime. The measurements are performed for different frequencies (100 Hz, 1 kHz, 10 kHz) as well as maximum current densities (2,5 A/cm2, 5 A/cm2).

[1]The authors would like to thank the financial support by the DFG via SFB 1316 (project B5)

Anna Lena Schoene
Ruhr University Bochum

Date submitted: 12 Jun 2020 Electronic form version 1.4