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Experimental and theoretical studies of the electrode impedance effect in capacitive discharges DENNIS ZIEGLER, THOMAS MUSSENBROCK, RALF PETER BRINKMANN, Ruhr University Bochum, YOHEI YAMAZAWA, Tokyo Electron AT LTD — It is widely acknowledged that one can observe a strong harmonics content in the current of an asymmetric capacitive discharge, even in case of a strongly sinusoidal driving voltage. This particular phenomenon is directly connected to the heating of electrons.[1] It has been shown by means of careful measurements that the increase of certain harmonics indicates an increase of the electron density.[2] In this paper we revisit these experiments. We also propose a model to study the possibility of controlling the excitation of current harmonics using an external circuit and its effect on the electron density (which is often referred to as the electrode impedance effect).

[1]T. Mussenbrock et al., Phys. Rev. Lett **101**, 085004 (2008).
[2]Y. Yamazawa et al., Jpn. J. Appl. Phys. **46**, 7453 (2007).

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