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Comparison between measured and simulated breakdown characteristics in micro discharges in argon ZORAN PETROVIC, MARIJA RADMILOVIC-RADJENOVIC, Institute of Physics, PAUL MAGUIRE, CHARLES MAHONY, Nanotechnology Research Institute, University of Ulster, Newtownabbey, NIKOLA SKORO, DRAGANA MARIC, Institute of Physics — Devices with micron and sub-micron gaps can face a serious challenge due to electrical breakdown during manufacturing, handling and operation. Therefore, it is necessary to be aware of the breakdown voltage for different gaps. Gas breakdown and Volt-Ampere characteristics are studied in an atmospheric pressure argon discharges. Experimental results are compared with the results obtained by using PIC/MCC code in order to establish whether the standard micro discharges operate in Townsend regime or in Glow Regime. The code is adjusted to include field emission effect in microgaps. It is applied manly for the breakdown stage but may also follow the formation of the space charge. The measurements of Volt-Ampere and breakdown characteristics of micro discharges were performed down to 20 μm gaps at pressures up to 400 Torr. Paschen curves reveal that very tight geometry is required to avoid long path breakdown at the left hand side of the Paschen curve. It is critical to measure width of the discharge to test the scaling and regime of operation of micro discharges.

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