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The gas generation measurement at high electric filed in electrokinetic devices MENA TAWFIK, THOMAS HANSEN, FRANCISCO J. DIEZ, Rutgers, The State University of New Jersey — In generating high EO flows, a limiting factor is faradaic reactions which appear at high electric fields. The gas released at the electrodes due to the faradic reaction forms bubbles which blocks the flow direction and increase the system resistance. To understand the factors that affect the bubble generated and its effect on the flow at high electric field, the gas generated is measured experimentally. Both DC and asymmetric bipolar rectangular voltage waveform are used to control the gas generated volume. Comparing the gas generated measured experimentally with that calculated theoretically, we found that the results have the same trend with about 50% gas generation efficiency. The gas generated volume is the same either applying DC or bipolar rectangular voltage waveform, however, it noticed that in the case of the bipolar rectangular voltage waveform due to the continuously switch of the flow direction, the bubble is detached early from the electrodes that leads to smaller bubbles formation compared to the DC voltage. The effect of the frequency of the bipolar rectangular voltage waveform is to reduce the gas generation by about 15% at high frequency >50 kHz. To the best of our knowledge this is the first time the gas generated was measured in electrokinetic devices.

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