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Ozone Generation with a Flexible Solid-State Marx Generator

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In this contribution we present our findings on efficient ozone generation for environmental applications using a flexible solid-state Marx generator with a DBD plasma reactor. The flexibility of the Marx generator allows for a parametric study over various parameters, such as voltage amplitude, pulse duration, pulse repetition rate and repeated bursts of pulses. We measured ozone concentrations and electrically characterized the plasma for all these parameters. From these measurements we obtained energy efficiencies and ozone yields. The results show high ozone yields (up to 80 g/kWh) and that this yield significantly decreases when the Marx generator is operated in burst mode. We also compare the results to a much faster spark-gap switched nanosecond pulse source with 200 picosecond rise time. The nanosecond pulses from this source produces plasma that is twice as energy efficient as the Marx generator with respect to ozone production. However, the advantage of the Marx generator is that it is much more flexible, compact, and above all: solid-state (and therefore has a significantly longer life time).

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