

Contribution ID: 49

Type: Poster

## An All Solid-State Nanosecond pulse generator for the waste water treatment

Monday 19 June 2017 13:30 (1h 30m)

Industrial pollutants and in particular pharmaceutical residues have caused large-scale pollution to the potable water in China. Many pharmaceuticals and macromolecular organic matter withstand conventional water treatment technologies. Consequently, advanced oxidation processes (AOP), and especially low-temperature plasmas with their ability to create reactive species including the hydroxyl radical which is currently one of the strongest oxidants in nature directly in water, may offer a promising solution. We developed a plasma reactor with a coaxial geometry to generate large volume corona discharges directly in water. To avoid that the corona discharges develop into arc discharges, high-voltage pulses with the duration of only a few hundreds of nanoseconds are required. Moreover, since the impedance of the waste water in the plasma reactor varies all the time, it is better not to require the impedance matching for the pulse generator. Therefore, an all solid-state nanosecond signals and the driving circuits are precisely designed to trigger 36 MOSFETs synchronously in a few nanoseconds. Finally, nanosecond pulses with voltage amplitude up to 30 kV, current amplitude up to 100 A, duration of 300 ns, rise time of shorter than 30 ns and frequency of 50 Hz are generated. Besides, all these parameters can be adjusted easily and the whole system is very compact and portable.

Key words : solid-state, low-temperature plasma, Marx, nanosecond pulse, water treatment

**Authors:** Mr DING, Jialin (University of Shanghai for Science and Technology); Dr JIANG, Song (University of Shanghai for Science and Technology); Prof. KOLB, Juergen (Leibniz Institute for Plasma Science and Technology e.V.); Prof. LI, Zi (University of Shanghai for Science and Technology); RAO, Junfeng (University of Shanghai for Science and Technology)

Presenter: RAO, Junfeng (University of Shanghai for Science and Technology)

Session Classification: Poster session I - Pulsed Power Industrial and Bio-Medical Applications

Track Classification: Pulsed Power Industrial and Bio-Medical Applications