OUTPUT CURRENT CONTROL SYSTEM OF A HIGH VOLTAGE ELECTRIC PULSE GENERATOR FOR PLASMA EXCITATION

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A control and pulse discharge current limiting system integrated into an AC/DC converter and pulse modulator of a high voltage pulse generator have been developed. The peculiarity of such system's operation is the stabilization of the power supplied to the discharge and the correction of the width of output electric pulses towards decrease upon reaching the specified pulsed current amplitude value. The system enables the pulse generator to work in the modes close to the “short circuited load” mode. In this case the driving module of a composite IGBT key performs the correction of the working pulse width and blocks the pulse generator operation if needed. The suggested circuit design solutions allow using the generator in a wide range of electric plasma-forming parameters' modes and working with various types of vacuum gas discharge systems.

PLASMA CHEMICAL REACTOR FOR LIQUID WASTE TREATMENT

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The plasma-chemical reactor with conventional air/oxygen as well as water vapor plasma torches for the treatment of liquid waste with elevated content of organic matter will be presented. The oxidation potential of a submerged plasma jet is combined with DBD discharge. The principal advantages of the reactor are: high local temperature of plasma jet and low temperature of treated liquid, which diminishes corrosion of the reactor wall; elevated quenching rate ($10^6 - 10^7$ K/s) preserves high concentration of radicals produced in discharge (O, OH, H, O_3, H_2O_2, O_3) to promote advanced oxidation processes for decontamination of aqueous effluents and suppress its recombination; high turbulence, induced by plasma jet, contribute to mass transfer from plasma to liquid; UV radiation; embedded off-gas treatment system (cooling, filtration, and neutralization). The principal working characteristics of the reactor and numerical simulation of the process will be presented.

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SIH_4 GAS FLOW RATE DEPENDENCE OF SI-H_2 BONDS DENSITY AT P/I INTERFACE OF A-SI:H LAYERED FILMS DEPOSITED BY PLASMA CVD

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One of the key issues for a-Si:H solar cells is suppression of light-induced degradation. To realize highly-stable a-Si:H solar cells against light exposure, suppressing Si-H2bond formation in films is needed. We have measured the hydrogen content ratio ISiH2/ISiH to evaluate the film quality and developed a method for suppressing Si-H2 bond formation. We found that the Si-H2 bond formation at P/I interface is suppressed at a high gas flow rate above 126 sccm and the spatial variation of film quality is smaller for the higher flow rate.

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