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AC (20kHz) excited plasmas in contact with liquid JINGJING LIU, MICHAEL KONG, PLASMA AND PULSED POWER GROUP TEAM — Dynamic interaction of ionized gases with liquid has been an active research area because of the considerable scope and depth of its underpinning science, examples of which include sonoluminescence and co-existence of phases (e.g. gas, liquid, solid and ionised gases). There are normally two major types of liquid-plasmas, namely above-liquid plasmas and in-liquid plasmas, the former being generated in a relatively stationary gas environment above the gas-liquid interface and the latter being generated within the liquid usually in gas bubbles.Electrical and optical characteristics of 20 kHz needle-water electrode plasmas are investigated in this paper. There are two working states: pulse state and steady state. Plasmas extinguish when the voltage polarity changes in the pulse state. It makes plasmas require high re-breakdown voltage in the next half cycle where the big pulse forms. However, there are some species left in the gap while plasmas quench, this makes the re-breakdown voltage much lower than the initial one. In the steady state, plasmas are more intense and always exist in the discharge gap, although they are weak during the voltage polarity change period. The remaining charges help re-develop plasmas in the next cycle. Plasmas influence the water property such as pH, conductivity and water due to the chemical reactions.

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