EFFEKT OF FLUID ELECTRICAL CONDUCTIVITI ON ACOUSTIC PULSE PARAMETERS IN LOW-VOLTAGE ELECTRICAL DICHARGE

Mostovyy Serhiy
National Technical University "Kharkiv Polytechnic Institute", Kharkiv

Underwater spark discharges are used in many technical applications. For example, they used as impulsive sound sources for seismic exploration, for minesweeping applications, as shock wave sources in medicine and as convenient means for study bubble dynamics. Actual also there are tasks about forming of shock acoustic waves with the set gain-frequency characteristics. The intensity and time evolution of the spark discharge are determined by the charging voltage *V*, the capacitance *C*, the circuit inductance *L* and resistance *R*, the discharge electrodes configuration, the working liquid properties and the hydrostatic pressure in the liquid. The change of electric durability of liquid at the increase of her conductivity results in predominating of electro-thermal form of the hasp caused by an ionic current, above an electric form. At the same time, at impulsive influences of tension duration of ten and less than microseconds, for the liquids of different chemical composition basic bit descriptions, such as, aggressive tension and speed of development of digit, does not correlate with in size conductivities. For the discharge circuit impulses by duration 200 μs – 2.0 ms with duration of front 30 μs - 200 μs and characteristic, for example, for acoustic generators and impulsive sound sources, it is set by us, that aggressive tension at length of work piece-to-electrode a 4-5 mm is in the interval of values 2.8 kV – 1.8 kV for conductivity of liquid at 1×10^{-2} S/m is a 3×10^{-1} S/m accordingly. It is also set that at such aggressive tensions the peak values of acoustic impulse fall with the height of conductivity of liquid (concentrations of solution of electrolyte) and in the indicated range of conductivities differ on the average in 4 times. The generation of underwater spark discharges true in water solution of NaCl in the indicated range of conductivities. The capacitors (total capacitance could be varied in 40μF steps from 40μF to 400μF) were charged from a high voltage source to voltages ranging from 1.0kV to 4.0kV, with most experiments done using voltages near 3.0 kV. The spark discharges were produced using as a sparker two electrodes. The parameters of acoustic impulse were measured by a hydrophone in the distance 1м near-by discharge electrodes with temporal permission 0.025 μs. Commutation in a discharge contour came true by the semiconductor high-voltage key in course of time commutations 2.0 μs – 30.0 μs and with the diode connected in parallel to the channel of spark discharges. Such schematic allowed to change the form of impulse of current on pulled-in multi exponential impulse. Change of spectral descriptions radiated signal in the indicated range of conductivities of electrolyte and range of frequencies of registration 100 Hz – 20 kHz it is not fixed.