Diagnostic studies of plasmas in NaNO₃ solutions are presented. The plasma is driven by a pulsed DC power with a 100 Hz repetitive pulse frequency, an applied voltage up to 600 V, and T_{on} from 10 to 500 μs. A Pt wire 0.5 mm in diameter covered with a glass tube is used as the plasma generating electrode. This electrode is facing upward. A bare Pt wire is used as the grounding electrode. Solution concentrations of 0.02 to 1 M are used. The bubble behavior and the plasma characteristics are strongly influenced by the applied voltage and T_{on}. With T_{on}=25 μs at 200 V, the bubble mode is observed. In this mode, bubbles with hundreds μm in diameter are formed and continuously detached from the electrode surface. With an increase in T_{on} or the applied voltage, a transition to the jetting mode is seen. In this mode, a large number of much smaller bubbles are jetted away from the surface. Calculation of the power and energy input within each power cycle for various applied voltage, T_{on}, and solution concentrations shows that the bubble to jetting mode transition occurs when the power and energy input exceed 45 W and $4\times10^{-3}$ J, respectively. Such an observation strongly suggests that the bubble to jetting transition is induced by electrothermal effect.

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