Abstracts

In our present work, we investigated the electron swarm parameters in gas mixtures of CF3I, SF6 with N2 at atmospheric pressure using Pulsed Laser-Induced Plasma Method. This paper presents the insulation characteristic of gas mixture containing CF3I as an alternative to SF6 from the view point of ion swarm parameters. The average drift velocities of positive and negative ions were investigated in gas mixtures of CF3I, SF6 with N2 at atmospheric pressure. The mixing rate of CF3I with N2 X was fixed to 0.1, 1.0, and 10.0%. The irradiation point of the pulse YAG laser Z was changed as 1.0, 2.0, and 3.0 cm below the upper rogowski electrode. In this way, weakly-ionized plasma was generated between the quasi-uniform field gap in test gas, and the average drift velocities of positive and negative ions were estimated from the ion current waveforms at various electric field strengths. As a result, three components of nitrogen ion and CF3I ions appeared in the ion current waveforms in N2/CF3I mixed gases. The two kinds of average positive ion drift velocities were measured by the same ion current. And, nitrogen ions and CF3I positive ion could be measured at the same time. From the result, the average drift velocities of positive ions derived from N2 and CF3I increased with increasing the applied electric field strengths, respectively. In addition, the average drift velocity of nitrogen ion was higher than that of CF3I ion. Besides, when the concentration of CF3I was high (X = 10.0%), the average drift velocities of both the positive and negative ions became slow. Furthermore, from the comparison of the average ion drift velocity in N2/CF3I with that in N2/SF6, the average drift velocity of CF3I was slower than that of SF6.