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Electron swarm coefficients for H₂O and H₂O-N₂¹ A.M. JUAREZ, ICF-UNAM, E. BASURTO, J.L. HERNANDEZ-AVILA, Universidad Autonoma Metropolitana-A, C.B.I., J. DE URQUIJO, ICF-UNAM — We have used a pulsed Townsend technique to measure the electron drift velocity v_e , the density normalized longitudinal diffusion coefficient ND_L , and effective ionization coefficient $(\alpha - \eta)/N$, in water vapour and water vapour-nitrogen mixtures over the density-reduced electric field range E/N , 16-650 x 10⁻¹⁷ V cm². The v_e values are in good agreement with previous ones, while those for ND_L agree well with a previous calculation. The limiting value for E/N was found to be $E/N_{lim} = 137 \times 10^{-17}$ V cm². For $E/N < 70 \times 10^{-17}$ V cm², the v_e curves lie below that for pure N₂; however, the 10% H₂O-N₂ curve for v_e shows the trend for negative differential conductivity. The $(\alpha - \eta)/N$ curve for H₂O shows a shallow, negative minimum, in disagreement with a recent measurement using the steady-state Townsend technique. The H₂O-N₂ curves for $(\alpha - \eta)/N$ show a progressively smaller minima, together with a trend to lower values of $(\alpha - \eta)/N$ as the N₂ content in the mixture increases. This research aims to provide a complete set of self-consistent electron swarm parameters for the simulation of flue-gas discharges.

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