Rate coefficients of He^+ ions in CF_4 gas

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This paper is dedicated to the presentation of the set of He^+ ions scattering cross-sections in CF_4 which is estimated using available experimental data for exothermic charge transfer cross-sections producing CF_3^+ and CF_2^+ ions and endothermic charge transfer cross-section producing CF^+, C^+ and F^+ ions. Due to significant particle losses, the experimental transport coefficients were not measured. The transport properties of He^+ ions in CF_4 required to model the discharge containing the mentioned ions were calculated by the Monte Carlo method at a temperature of T = 300 K. In this paper we give the characteristic energy and specially rate coefficients for low and moderately reduced electric fields *E /N* (*E*-electric field, *N*-gas density) and accounting for non-conservative collisions.

He-CF_4 mixtures are used in gas electron multipliers for various imaging purposes (X-rays, charged particles, thermal neutrons and dark matter detection) (Fraga M.M.F.R. et al. 2008). Bursts of electron multiplication affect production of various ions that may affect time distribution of detected particles (Bošnjaković D. 2016).

References

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