Transport properties of H_2^+ ions in H_2 gas

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Cold plasmas are frequently used in new technologies where they open up possibilities of non-intrusive production or modification of various substances (Makabe and Petrović, 2006). These plasmas have a high electron temperature and low gas temperature, so the non-equilibrium behavior of a large number of species becomes important (Robson et al., 2005).

In this work we present a complete cross sections set and transport properties of H_2^+ in H_2 gas. Ionic charge transfer reactions with molecules are indispensable elementary processes in the modeling of kinetics in terrestrial, industrial and astrophysical plasma in the detection of dark matter (Kaboth et al., 2008). A Monte Carlo simulation method is applied to accurately calculate transport parameters in hydrodynamic regime. We discuss new data for H_2^+ ions in H_2 gas where the mean energy the flux and bulk values of reduced mobility and other transport coefficients are given as a function of low and moderate reduced electric fields *E/N* (*E*-electric field, *N*-gas density).

References

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