

Transport coefficients of ions and electrons in pure gases and mixtures: Recent measurements and calculations

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There is a growing demand of swarm transport coefficients of electrons and ions in view of its importance for the simulation and modelling of electrical discharges. On the other hand, complex phenomena such as negative differential conductivity of electrons and Penning ionization, for example, are still in the process of being explained thoroughly. Ion motion is also a matter of intensive research since ion transport coefficients are now being widely used both in gas discharge modelling and in applied areas such as ion mobility mass spectrometry. In this respect, the refinement of models dealing with ion motion in the gas mixtures demand a knowledge of the ion mobility in the pure gases and in the gas mixtures. Moreover, recent calculations have shown the usefulness of the simultaneous combination of theory and experiment in order to test the cross sections sets in the calculations, and to extend, wherever possible, the range of calculations to regions of the density-reduced electric field where the experiment is still difficult to perform.

This talk will be dedicated to the discussion of recent measurements and calculations of the drift velocity (mobility) and diffusion coefficients of ions and electrons in several gases and gas mixtures, paying special attention to the processes such as negative differential conductivity, and also to the derivation of cross sections from measured swarm transport coefficients, an issue that may be controversial under some circumstances.