

Abstract Submitted
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Electron Transport in Water Vapour SATORU KAWAGUCHI, KOHKI SATOH, HIDENORI ITOH, Muroran Institute of Technology — Sets of electron collision cross sections for water vapour previously reported are examined by comparing calculated electron swarm parameters with measured parameters. Further, reliable cross section set of water vapour is estimated by the electron swarm method using Monte Carlo simulation to ensure the accuracy of the swarm parameter calculation. The values of an electron drift velocity, a longitudinal diffusion coefficient, and an effective ionisation coefficient calculated from Yousfi and Benabdessadok's set [J. Appl. Phys. 80, 6619 (1996)] and those calculated from Itikawa and Mason's set [J. Phys. Chem. Ref. Data 34, 1 (2005)] do not necessarily agree with measured data. A new cross section set of water vapour, which consists of three kinds of rotational excitation, two kinds of vibrational excitation, three kinds of electron attachment, twenty-six kinds of electronic excitation, and six kinds of ionisation cross sections, and an elastic collision cross section, is estimated, and an anisotropic electron scattering for elastic and rotational excitation collision is considered. The swarm parameters calculated from the estimated cross section set is in good agreement with measured data in a wide range of reduced electric field.

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