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Calculated electron impact dissociation cross sections for H_2O_2[1]
ANDREW R. GIBSON, University of York, JAMES HAMILTON, JONATHAN TENNYSON, University College London, SANDRA SCHROETER, TIMO GANS, DEBORAH O'CONNELL, University of York — Hydrogen peroxide (H_2O_2) is thought to be a key plasma produced reactive species in the context of biomedical applications. Data concerning electron collisions with H_2O_2, which are important for properly understanding its kinetics in plasma sources, is however, extremely limited. In this work, the UK polyatomic R-matrix method is used to calculate electron impact excitation and dissociation cross sections for H_2O_2. These cross sections focus on the dissociation of the O-O bond leading the formation of two OH radicals. The total electron impact dissociation cross section is calculated as the sum of the cross sections to the first 11 electronically excited states of H_2O_2, with the largest individual cross section corresponding to that for the lowest lying a^3A state, with a threshold energy of 5.12 eV. Rate coefficients for electron impact dissociation of H_2O_2 for various electron temperatures and distribution function shapes will be presented. These are compared with those normally estimated for use in plasma modelling. The presented calculations significantly increase the dataset for electron impact processes with H_2O_2.

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