Compilation of cross sections for kinetic models of low pressure hydrogen discharges

A.V. PHELPS, JILA, University of Colorado and NIST —

We report an initial compilation of cross sections that have been used to model\textsuperscript{1,2} the collisional kinetics of low-pressure discharges in H\textsubscript{2}. Processes that are considered include electron momentum transfer, excitation, and ionization collisions with H\textsubscript{2}; momentum transfer, H\textsubscript{\alpha} excitation, ionization, and charged pair formation in collisions of H\textsuperscript{+}, H\textsubscript{2}\textsuperscript{+}, H\textsubscript{3}\textsuperscript{+}, H, H\textsubscript{2}, and H\textsuperscript{−} with H\textsubscript{2}; collisions of electrons, H\textsuperscript{+}, H\textsubscript{2}\textsuperscript{+}, H\textsubscript{3}\textsuperscript{+}, H, H\textsubscript{2}, and H\textsuperscript{−} with graphite and Cu surfaces resulting in secondary electrons, particle reflection, and negative ion formation. For each major category, the compilation includes a section reviewing data sources. The recommendations are expressed as analytic formulas expected to be good to ±10\%. This compilation is expected to be refined from time to time. As part of the Plasma Data Exchange Project, the compilation will be made available at http://www.lxcat.laplace.univ-tlse.fr/ and/or http://www.icecat.laplace.univ-tlse.fr/.