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**New trends in low–energy electron collisions with molecules**
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Experimental studies on electron-polyatomic molecular collisions are reviewed in connection with the plasma processing and environmental issues. Recent developments in electron scattering experiments on differential cross sections (DCSs) are summarized for various processes such as elastic scattering, vibrational, and electronic excitations, including the dissociative attachments as well as the radical formation. Three illustrative examples are described specifically as follows: 1) perfluocarbons as the main feed gases in the plasma etching industry and the need to replaced by alternative compounds that have low global warning potentials, e.g. COF$_2$, C$_3$F$_6$, and l–C$_4$F$_6$; 2) detection of non-emissive CH$_3$ radicals via the low-lying electronic states of CH$_4$ by electron impact; and 3) the electronic spectra of thymine by electron impact methods, also including H$_2$O. This work was supported by the Ministry of Education, Sport, Culture and Technology, the Japan Society for Promotion of Science, the Japan Atomic Energy Research Institute, and the CUP program between Japan and South Korea. In collaboration with Masamitsu Hoshino, Department of Physics, Sophia University, Chiyoda-ku, Japan; Casten Makochekanwa, Department of Physics, Sophia University, Chiyoda-ku, Japan; Hyuck Cho, Physics Department, Chungnam National University, South Korea.