

A Modified Potential Method for Electrons Scattering Total Cross Section Calculations on Several Molecules at 30~5000 eV: CF_4 , CCl_4 , $CFCl_3$, CF_2Cl_2 , and CF_3Cl

MA Heng,¹ SHI De-Heng,^{1,2} SUN Jin-Feng,¹ LIU Yu-Fang,¹ and ZHU Zun-Lue¹

¹ Department of Physics, Henan Normal University, Xinxiang 453007, China

² Department of Foundation, the First Aeronautical College of Air Force, Xinyang 464000, China
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Abstract: A complex optical model potential modified by the concept of bonded atom, which takes into consideration the overlapping effect of electron clouds between two atoms in a molecule, is employed to calculate the total cross sections (TCSs) for electrons scattering from several molecules (CF_4 , CCl_4 , $CFCl_3$, CF_2Cl_2 , and CF_3Cl) over an incident energy range 30~5000 eV using the additivity rule model at Hartree-Fock level. The quantitative TCSs are compared with those obtained by experiments and other theories wherever available, and good agreement is obtained above 100 eV. It is shown that the modified potential can successfully calculate the TCSs of electron-molecule scattering over a wide energy range, especially at lower energies.

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Key words: total cross section, additivity rule, atomic and molecular collision

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