Total cross sections of C_nH_6 (n = 2, 3, 4) molecules by e^- and e^+ impact

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Synopsis We report electron & positron impact total cross sections of C_nH_6 (n=2, 3, 4) from threshold to 2000 eV using semi empirical method called Complex Optical Potential (COP) method. We Conclude from the results obtained through COP that total cross sections of electron scattering dominates over positron scattering above inelastic peak of energy and at high energy they have very less difference in terms of cross section magnitude.

In modeling and simulating effects induced by electrons traversing through matter, the relevant cross section data are required as an input. The practical need of cross section data with electron/positron arises for laser development, various plasma and atomic fusion schemes, astrophysical and atmospheric modeling purposes etc. Positrons are of interest in plasma physics because they annihilate electrons and because, with the same mass and opposite charge, positrons and electrons can be combined to form neutral plasmas with a dynamical symmetry between the charge species.

An overview is given of recent progress in the calculation of electron and positron scattering on atoms and molecules using the complex potential formalism [1, 8]. Presently we have calculated the total cross sections of C_nH_6 (n = 2, 3, 4) molecules by electron and positron impact. The molecular structures of our targets are as shown in below figures (1-3).

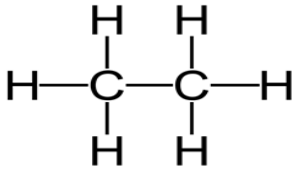

Figure 1 Geometry of Ethane C_2H_4

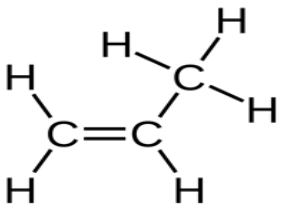

Figure 2 Geometry of Propene C_3H_6

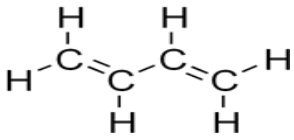

Figure 3 Geometry of 1, 3 butadiene C_4H_6

Using COP method we have successfully calculated all various scattering cross sections like Q_T, Q_{el}, Q_{inel}, Q_{ion}, Q_{exc} by electron and positron impact for many atoms and molecules [1-8].
Our total cross section,

$$Q_T = Q_{el} + Q_{inel}$$

Where,

$$Q_{inel} = Q_{ion} + Q_{exc} \text{ for electron \&}$$
$$Q_{inel} = Q_{ps} + Q_{ion} + Q_{exc} \text{ for positron}$$

We find significant differences between electron and positron projectiles, in the magnitudes of their respective TCSs and subtle differences in the energy dependence of these TCSs.
The present results will be presented and discussed in the Conference.

References

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