

Dissociative electron attachment to polyatomic molecules

Shan Xi Tian

Hefei National Laboratory for Physical Sciences at the Microscale, Department of Chemical Physics, University of Science and Technology of China

Dissociative electron attachment (DEA) to molecule is an important process in plasma, interstellar space and atmosphere, and it continuously receives attention of physicists and chemists. Since 2012, our group focuses on the experimental study of DEA processes by using the home-made anion velocity map imaging (VMI) spectrometer, and more details about the DEA dynamics have been revealed and many fundamentals about electron-molecule resonance as the intermediate complex of DEA have been refreshed. More recently, a high-resolution spectrometer is set up in our laboratory, in which the trochoidal electron monochromator is combined with the VMI technique for the first time. This key progress enables us to have more insights into the DEA dynamics.

Here I will review our recent progresses on the DEAs to polyatomic molecules, in particular, about molecular CO₂. Our recent findings on the electron-nuclear motion coupling by using the high-resolution spectrometer exhibit some challenges to electron-molecule scattering theory.

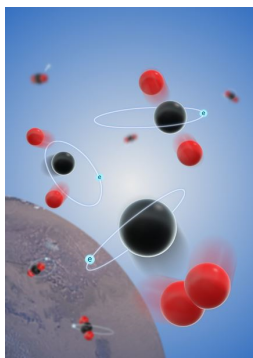


Figure 1: DEA process is a possible pathway to produce molecular O₂ in Earth's prebiotic primitive atmosphere.

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- [2] Wang X -D, Gao X -F, Li H and Tian S X 2019 *Rev. Sci. Instrum.* (submitted)
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- [4] Wu B *et al* 2012 *Phys. Rev. A* **85** 052709
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