



## **Critical evaluation of rates and cross sections: (a) vibrational energy transfer between O<sub>2</sub> and H<sub>2</sub>O and (b) yields of O(<sup>1</sup>S) and O(<sup>1</sup>D) from photodissociation of CO<sub>2</sub> and H<sub>2</sub>O**

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We propose a long-term program of critical evaluation of the rates and cross sections of atomic and molecular processes that are needed for understanding and modeling the atmospheres in the solar system. The ongoing JPL/NASA Panel for Data Evaluation and the efforts of the international combustion modeling community already provide some important inputs for modeling the atmospheres of the Earth, planets, moons, and comets. However, their applications restrict the choice of which processes to evaluate and the temperature and pressure ranges to cover, thus leaving large gaps that need to be filled. What is needed is not a just a list of processes and numbers (i.e., a "database"), but rather serious comparison of the available information and specific statements from independent expert laboratory/theory data providers about what should be believed, what uncertainty to assign, and what is most in need of re-determination. The major topic areas would include the following:

1. Chemical reactions of neutral atoms and molecules in their ground electronic states
2. Ion-molecule reactions
3. Chemistry, relaxation, and radiation of electronically excited atoms and molecules
4. Vibrational and rotational relaxation and radiation
5. Photoabsorption, photodissociation, and photoionization
6. Electron-impact excitation, dissociation, ionization, and recombination
7. Energetic heavy particle excitation and charge exchange