Sidney Benson Lecture

Gas Kinetics - the interface between experiment, theory and application

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The Sidney Benson lecture is intended as a keynote introductory lecture of the symposium, providing an opportunity to review overall developments in the field and to provide insight to future directions and outstanding major challenges.

Recent years have seen remarkable advances in experimental and theoretical chemical kinetics, which have led and, in some cases been initiated by, applications in a range of areas, especially in the chemistries of combustion, of the atmospheres of the earth and of other planets and of the interstellar medium. Applications place strict requirements of temperature, pressure and concentration on kinetics. Demanding extrapolations are often needed that are increasingly met by a close integration of experiment and theory.

This lecture will touch on a number of topics which illustrate the interface between experiment, theory and applications, many of which are covered in depth in the symposium. These topics include:

- Low temperature combustion of organic compounds and low NO_x atmospheric oxidation of isoprene – reactions of peroxy and hydroperoxy radicals.
- Kinetics at low temperatures – surprises and predictions.
- The role of direct and indirect measurements in the determination of rate coefficients and their uncertainties.
- Reactions in solution – applying ideas from the gas phase.
- Thermodynamic databases.
- Constructing chemical mechanisms.