HIGH RESOLUTION SPECTROSCOPY: THE CHEMIST'S FRIEND

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The key to controlling complex chemical processes is understanding the underlying mechanism. For many processes of economic or societal interest such as combustion and atmospheric chemistry, the mechanism contains hundreds or thousands of elemental steps with a comparable number of reactive chemical intermediates. Spectroscopic diagnostics capable of identifying and quantifying these intermediates are critical for experimentally following the reaction kinetics and dynamics as well as for benchmarking computational studies of these systems. In recent years we have studied reactive intermediates, such as alkoxy, RO, and peroxy, RO_2, radicals relevant to the oxidation of organic molecules. Analyzing the high resolution, rotationally resolved spectra of such radicals is critical to distinguishing among different, but chemically closely related R groups, as well as identifying various isomers and conformers of alkoxy and peroxy radicals. This talk will review our recent progress in the area and look at likely future developments.