APPLICATIONS OF CAVITY RING-DOWN SPECTROSCOPY IN ATMOSPHERIC CHEMISTRY

A.J. ORR-EWING, F.D. POPE, M.I. MAZURENKA, W.H. HOWIE, I.C. LANE, AND S.M. NEWMAN,
School of Chemistry, University of Bristol, Cantock's Close, Bristol BS8 1TS, UK.

A variety of measurements of importance for atmospheric chemistry are enabled by the high sensitivity, generality and quantitative nature of modern laser absorption spectroscopy techniques such as cavity ring-down spectroscopy (CRDS). Examples drawn from studies of the spectroscopy and photochemistry of the halogen monoxides, FCO radicals, HCHO and other trace atmospheric constituents will illustrate the use of CRDS to measure absorption cross sections, concentrations, reaction rate coefficients, and the mechanisms and pathways of ultra-violet and visible photolysis. The outcomes of such measurements, supported where necessary by ab initio calculations of ground and excited electronic state potential energy curves, help to expose the roles and fates of these chemical species in the atmosphere.