

“Tropospheric Chemistry of Peroxy Radicals”

by

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ABSTRACT

It is now well known that much of the chemistry of the lower atmosphere is driven by reactions involving organic pollutants, oxides of nitrogen and sunlight. However, many of the details of the reaction mechanisms are still not established, and this lack of understanding may translate into significant uncertainties in our ability to predict changes in air quality and climate.

Organic peroxy radicals (RO_2) and hydroperoxy radicals (HO_2) are intermediates formed during the atmospheric oxidation of virtually all organic pollutants. In much of the lower atmosphere, the major fate of these species is reaction with each other ($\text{RO}_2 + \text{HO}_2 = \text{Products}$). Despite their importance, there are surprisingly few measurements of the products of these reactions.

In this work, a photochemical reactor was used to measure the product distributions from the reactions of a range of organic peroxy radicals with hydroperoxy radicals. The measurements demonstrate that these reactions are sometimes far more complex than previously thought. Results from this work and their implications for the chemistry of the lower atmosphere will be discussed.