

High Resolution Spectroscopy of CH₂OO and the Kinetics of its Reactions with Inorganic Acids

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Carbonyl oxides, or Criegee Intermediates (CIs), are formed from the gas phase ozonolysis of alkenes and play a pivotal role in night-time and urban area atmospheric chemistry. There are significant discrepancies between existing measurements of the strong $\tilde{B}1A'$ - $\tilde{X}1A'$ electronic transition of CH₂OO in the visible/near-UV. We report high-resolution spectra of the $\tilde{B}1A'$ - $\tilde{X}1A'$ electronic absorption band of CH₂OO using both single-pass broadband transient absorption spectroscopy and cavity ring-down spectroscopy, which will help to resolve current debate over the excited state lifetime and the origin of discrepancies amongst previous spectroscopic measurements. We have also investigated the kinetics of reactions between CH₂OO and inorganic acids and evaluated their significance with respect to reactions with other trace gases (SO₂, NO₂) that are present in the atmosphere with comparable number densities.