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Near-UV photolysis cross sections of CH₃OOH and HOCH₂OOH determined via action spectroscopy

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Abstract. Knowledge of molecular photolysis cross sections is important for determining atmospheric lifetimes and fates of many species. A method and laser apparatus for measurement of these cross sections in the near-ultraviolet (UV) region is described. The technique is based on action spectroscopy, where the yield of a photodissociation product (in this case OH) is measured as a function of excitation energy. For compounds yielding OH, this method can be used to measure near-UV photodissociation cross section as low as 10⁻²³ cm² molecule⁻¹. The method is applied to determine the photodissociation cross sections for methyl hydroperoxide (CH₃OOH; MHP) and hydroxymethyl hydroperoxide (HOCH₂OOH; HMHP) in the 305–365 nm wavelength range. The measured cross sections are in good agreement with previous measurements of absorption cross sections.

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