

HYDROPEROXYL RADICAL DETECTION BY MCLA CHEMILUMINESCENCE

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ABSTRACT

Hydroperoxyl radical (HO_2) is produced from the reaction of hydroxyl radicals with organic compounds in the atmosphere, and by photolysis of formaldehyde. Detection of HO_2 is a challenge due to their low abundance and short lifetime. We have developed a flow injection method for HO_2 analysis that is based on the chemiluminescence produced when an aqueous solution of HO_2 and its conjugate base O_2^- react with MCLA, a synthetic analog of the luciferin from the crustacean *Cypridina*. The technique is linear at least up to $1\text{-}\mu\text{M}$ $\text{HO}_2(\text{aq})$, and has a minimum detection limit of 0.1 nM . We calibrate the instrument with stable aqueous O_2^- standards produced in submicromolar concentration using ^{60}Co gamma radiolysis. The method is simple, low-cost and has minimal size and power requirements, making it an attractive candidate for field deployment. We have demonstrated that the technique can be used to measure atmospheric HO_2 radicals following collection into aqueous solution in a glass coil scrubber.