**4.023 Improved analyzer for biogenic volatile organic compounds as total ozone reactivity and its application to kinetics of gas-phase reactions.**

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**Abstract:**

Biogenic volatile organic compounds (BVOCs) have been focused on as precursors of tropospheric ozone (O_3) and secondary organic aerosols. Various species of BVOCs have C=C double bonds and can react with O_3. To capture BVOCs comprehensively, a total ozone reactivity (R_{O_3}, the sum of k_i[VOC_i]) analyzer has been developed [1-3]. R_{O_3} of sample BVOCs can be determined when decrease of O_3 due to BVOCs+O_3 is precisely monitored. Initial O_3 concentration was set to be 30 ppbv. Cyclohexane was added as an OH scavenger. Detection limit of the prototype analyzer was 1.4x10^{-4} s^{-1} (S/N=3, 60-s average, 60-s reaction). To apply the analyzer to field observations and/or laboratory studies where precise measurements of O_3 and R_{O_3} are essential, further improvement of the analyzer is necessary. In this study, the analyzer was successfully improved through optimization of (1) O_3 detector, (2) O_3 supply, and (3) reaction chamber. The acquired detection limit of R_{O_3} was 0.2x10^{-4} s^{-1}. As an application, temperature dependence of rate constant, k(T), for gas-phase reaction of a BVOC with ozone was explored. In this study, linalool, (CH_3)_2C=CHCH_2CH_2C(CH_3)(OH)CH=CH_2, was examined. For linalool, k(296K) can be referred as 4.3x10^{-16} cm^3 molecule^{-1} s^{-1} [4]. The detection limit of improved R_{O_3} analyzer corresponded to 5 ppbv as linalool equivalent. R_{O_3} of linalool at 310 K was quantified as 5 % smaller than that at 296 K. k(310K) was estimated as 4.1x10^{-16} cm^3 molecule^{-1} s^{-1}. Consequently, it was indicated that the rate constant of linalool+O_3 reaction decreased by 5 % when the temperature changed from 296 K to 310 K.