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Atmospheric Chemistry and Physics Discussions

Interactive comment on "298 K rate coefficients for the reaction of OH with *i*-C_3H_7I, *n*-C_3H_7I and C_3H_8" *by* "S. A. Carl and J. N. Crowley"

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The following are replies to the numbered specific comments of referee 1.

1. The conclusion that reaction with OH is an important loss process for propyl-iodides in the MBL will be included in the abstract of the revised manuscript.

2. The resonance lamp for OH detection utilised a flowing mixture of H_2O in circa 3 Torr He. This will be mentioned in the experimental section of the revised manuscript.

3. As is usual with absorption measurements, the deuterium lamp is of such low intensity that only an insignificant fraction of the gas to be analysed is dissociated.

4. With 2x 10^{16} cm^{-3} H_2 present, reaction 7 goes to completion in less than 1 μs to form both "rapid" OH and H. The conversion of H to OH in reaction 8 takes circa 10 μs and therefore defines the time at which OH formation is complete. The text will be modified to include this.

5. We cite a quenching rate coefficient of 4.8x 10^{-11} for OH (v=1) with NO_2. At an NO_2

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concentration of 5x 10^{14} cm^{-3} this results in a half-life for quenching of circa 40 μs. This is short compared to the time scales of the OH decay, which were followed out to 3000 μs. The text on page 27 will be modified to include results of this calculation.

6. By analogy with O(^{3}P) + C_2H_5I, [Monks et al., 1995] the branching ratio for the reaction of O(^{3}P) with C_3H_7I is expected to favour HOI formation (circa 0.9) over IO formation (0.1). This will be mentioned in the revised manuscript. The formation of OH by secondary photolysis of HOI cannot result in a slower decay of OH as the laser pulse if of only circa 20 ns duration. The loss of OH is measured over a period of milliseconds.

7. Measurements of OH in the marine boundary layer [Brauers et al., 2001] have shown that for overhead sun and clean air, OH concentrations of up to 7x 10^6 cm^{-3} are reached. The value of 5x 10^6 cm^{-3} used here is therefore reasonable. The work of Brauers et al. will be cited in the revised version of the manuscript.

8. The use of the two-photon dissociation of NO_2 in the presence of H_2 to make the OH is only a detail of the experimental procedure, and does not warrant further comment apart from in the description of the experimental setup (where references to previous, detailed descriptions are given).

References:

Brauers, T., Hausmann, M., Bister, A., Kraus, A., and Dorn, H.P., OH radicals in the boundary layer of the Atlantic Ocean 1. Measurements by long-path laser absorption spectroscopy, J. Geophys. Res., 106, 7399-7414, 2001.

Monks, P.S., Stief, L.J., Tardy, D.C., Liebman, J.F., Zhang, Z., Kuo, S.-C., and Klemm, R.B., Discharge flow-photoionisation mass spectrometric study of HOI: Photoionisation efficiency spectrum and ionization energy, J. Phys. Chem., 99, 16566-16570, 1995.

Interactive comment on Atmos. Chem. Phys. Discuss., 1, 23, 2001.