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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Does acetone react with HO₂ in the upper-troposphere?" *by* T. J. Dillon et al.

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This study describes lab experiments designed to investigate the interaction of HO2 radicals with acetone at low temperatures. It also includes a brief modeling section to investigate the possible effects of the reaction in the atmosphere.

The study is somewhat indirect, since it involves the conversion of HO2 radicals to OH, and detection of OH by LIF. However, the effects on the HO2 profiles shown in the figure are consistent with a reaction, particularly at low temperatures. Overall, I am surprised that the addition reaction of HO2 with acetone appears to be so fast, but it does agree with the predictions of the paper by Hermans et al. (J. Phys. Chem. A, 2005)

The study is careful, and within the uncertainties of the conversion technique and chemical modeling required to quantify the results, robust. It can be published with some changes.

Experimental: The authors should consider the effects of methanol on the reaction scheme. A quick look at the paper of Christensen (J. Phys. Chem. A, 2006) suggests that about 20% of the HO2 should be complexed at 207 K. Could this affect the kinetics of the acetone reaction, e.g., if only uncomplexed HO2 were to react? How does the estimated rate constant for dissociation of the methanol complex compare with that for the acetone adduct or the NO reactions?

It would be useful to give the pressure(s) in the text here.

Also, in either the table or text, please give the lowest non-zero acetone concentration (zero is not particularly useful).

Page 16757, line 17. "recation" should be "reaction"

Modeling: The description of the models could be a little clearer. Which ones had the acetone reaction included?

Page 16760, line 5. Should be "AN additional route"

ESM P3. "oxyde" should be "oxide"

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 16747, 2010.