

## ***Interactive comment on “Atmospheric degradation of 3-methylfuran: kinetic and products study” by A. Tapia et al.***

**Anonymous Referee #1**

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Atmospheric degradation of 3-methylfuran: kinetic and products study A. Tapia, F. Villanueva, M. S. Salgado, B. Cabañas, E. Martínez, and P. Martín Atmos. Chem. Phys. Discuss., 10, 22905-22952, 2010

The paper displays good craftsmanship by a well-reputed research group. The work is based on established experimental procedures that were skilfully used by the authors. The interpretation of data makes good sense and supports the conclusions drawn. New information of value to the atmospheric chemistry community is given.

However, according to the Referee, there are still some possibilities for improvement of this manuscript. Below is given one list of items that need to be addressed and one list of suggestions of “cosmetic” character.

C8505

Items that need to be addressed

My main point is that the paper is too long compared to the hard facts that are presented. The authors should try to shorten it considerably e.g. by deleting words and phrases that carry little or no information and by avoiding repetition of facts, especially in section 3 and 4.

Rate coefficients were determined by relative methods. Perhaps a few words about error propagation in a self-consistent set of rate coefficients would be appropriate. Are there other similar compounds with rate coefficients determined by absolute methods that could be used for comparison?

The expression “kinetic rate coefficient” is used in several places. Remove “kinetic”

p 1 | 6 “absolute rate coefficients” Not obvious what is meant by “absolute”. The reaction order for which a coefficient is given is apparent from its units. Further, this number was determined by relative measurements as opposed to absolute measurements. Remove “absolute”

p 1 | 8-9 The sentence “These rate coefficients...” does not carry any information. Remove

p 1 | 25 “and the degradation products of biogenics” I don’t understand – rewrite

p 1 | 29-30 If it is measured then it is detected, delete “detected”.

p 3 | 15-16 Strictly speaking, this means that the kinetic experiments with OH were made exclusively in air and the NO<sub>3</sub> experiments exclusively in nitrogen. Is this true?

p 3 | 17-18 Again, strictly, “respectively” links  $k_s$  and  $k_r$  with OH and NO<sub>3</sub> (respectively) and I do not think this is what was meant. Rewrite this sentence.

p 3 | 22 This is not the proper reference for the relative rate technique and it should be exchanged. The technique and mathematical framework was available at least as early as 1982 (e.g. Atkinson et al. Int. J. Chem. Kin.14, 781 1982), possibly earlier.

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p 5 | 7 There is a mix of pressure units in the paper, please do not use Torr...

p 5-7 and elsewhere There are six? sets of "lamps", sometimes referred to by maker and product number, sometimes by a single wavelength. Is there a way of making this less confusing, (e.g. are the 360-lamps on p 6 | 20 the same as on p 6 | 30?)

P 8 and elsewhere "NO<sub>x</sub>" The use of this concept implies that the authors do not know (but of course, they do) what they add since, by definition NO<sub>x</sub> = NO + NO<sub>2</sub>. Most likely they add NO that is turned into NO<sub>2</sub> e.g. by peroxy radicals as the reaction proceeds. It is suggested that the actual, initial gas composition is given rather than "NO<sub>x</sub>"

p 11 | 3 change "determined" to "estimated"

p 11 | 6-7 Why should the present rate coefficient be preferred as "reference data" when it is equal within the limits of error to that proposed by Atkinson et al. and has the same error associated with it?

p 11 | 21 Are these commercial libraries or custom? They were not mentioned earlier.

p 13 | 20-21 A reference addressing the OH-formation would be appropriate.

p 14 | 17 "the wuppertal laboratory" ????

p 15 | 4 Why would FTIR measurements overestimate concentrations?

p 20 | 4-5 the mixing ratio is less interesting than the yield – delete ppb, keep yield

p 25 | 26 something happened to this reference

p 25 | 27 this is not the proper name of the book

Table 2 Is (%C) and "molar yield (%)" the same thing? If so why use different nomenclature. If not, then %C needs some explanation

Table 3 is a "one-liner", consider putting the numbers into the text or reorganise the table

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Consider putting the straight line-plots (fig 1 and 2) in the supporting material and lift supporting figure 3 into the paper. Comment in the text on the intercepts in fig 1 and 2. Do they differ significantly from zero?

Figure 3 has A, B, C in the wrong order

p 37 Text to figure 4. Is the timing really done with "fraction of second" resolution?

cosmetics (some points but there may be more)

p 1 | 16 "is the addition" suggest "is addition"

p 1 | 20 "for both Cl" suggest "for Cl"

p 2 | 23 In principle just one rate coefficient, use singular

p 7 | 14 "in" suggest "at"

p 7 | 23 suggestion remove "every"

p 8 | 25 reaction singular

p 8 | 26 were → was

p 8 26-27 suggestion delete "in the experimental set-up"

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Interactive comment on Atmos. Chem. Phys. Discuss., 10, 22905, 2010.

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