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Atmospheric
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Interactive comment on "A new method for total OH reactivity measurements using a fast Gas Chromatographic Photo-Ionization Detector (GC-PID)" *by* A. C. Nölscher et al.

Anonymous Referee #2

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The article "A new method for total OH reactivity measurements using a fast Gas Chromatographic Photo-Ionization Detector (GC-PID)" by Nölscher, et al. describes the use of a gas chromatograph instrument for the detection of pyrrole in OH reactivity measurements using the competitive rate method, CRM. Generally I find the work to be useful and of good quality. With the development of measurement techniques, OH reactivity has recently increased in importance in constraining atmospheric models of OH chemistry. However the current measurement techniques all involve large and expensive instrumentation. The detector presented here represents a new small and relatively inexpensive alternative for OH reactivity measurements. One major comment

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that I have is with the title. The work does not describe a new method for OH reactivity measurements, but rather a new detector for use in the previously published competitive rate method. I would strongly suggest changing the title to reflect this fact. Perhaps the title of section 2.3 – “A new detector for CRM total OH reactivity measurements: a Gas Chromatographic Photo-Ionization Detector (GC-PID)”. I would also like to see more quantification presented in the work as a whole. Aside from these two general comments, I find the work to be thorough, with intercomparisons made between the new detector and the previously vetted PTR-MS in laboratory, field, and chamber environments. The limitations of the instrument are described, however more quantification could be given to the subjects of potential interferences and the effects of relative humidity. Overall the instrumentation described will be a welcome addition to the arena of atmospheric measurements. Specific comments: 1. A more detailed description of how hysteresis, changing sensitivity, humidity changes, and NO are accounted for in the reactivity calculation would be informative. 2. The system is described as a custom built GC-PID system from Environics-IUT GmbH. How is this system different from those commercially available? 3. In Figure 1, why use arbitrary units for time and counts for signal instead of seconds and concentration? What is the cause for the offset observed? Why is the H2O signal inverted? 4. In the standard tests performed with propane and propene, give a quantified value of how the rate coefficients or rates measured compare with the published values. What does “generated reasonable and comparable results” mean? 5. In Figure 8, it appears that values are plotted that are below the stated LOD – even a couple of negative values. Perhaps it would be good to put a shaded area showing the LOD and below, or to remove those points altogether as they have no statistical meaning. A few more sentences detailing the Diel behavior of the reactivity and why it rose to 40 s-1 would be informative. 6. In Figure 10, the data for Sep 10 – Sep 11 before 12:00 PM there appears to be an offset between the GC-PID and the PTR-MS values. Then there is a break in the data after which the GC-PID data becomes noisier, but with better overlap. What changed? Again values below the stated LOD are plotted. How hard is it to clean/service the detector? 7.

The “Discussion and comparison” section is really a summary – perhaps change the section title.

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