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Atmospheric Measurement Techniques Discussions

Interactive comment on "A compact, high-purity source of HONO validated by Fourier Transform Infrared and Thermal Dissociation Cavity Ring-down Spectroscopy" *by* Nicholas J. Gingerysty and Hans D. Osthoff

Anonymous Referee #2

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The authors present an optimized HONO calibration source that is based on the design of Febo et al., 1995, where HCl vapor is passed over solid NaNO2. They used a permeation tube to achieve lower (< 4 ppmv) HCl mixing ratios which is key to achieve higher purity as ClNO formation is slowed down. They quantified the impurities by using FTIR spectroscopy and TD-CRDS and found the optimized design of the source to be of > 97 % purity. With the optimized design (lower HCl supply) they were able to generate HONO concentrations in the low ppm range and by further dilution in the lower ppb range. The stabilization time of 1.5 h was short compared to other source designs.

Furthermore, the source is portable and after stabilization, HONO mixing ratios are readily tunable. Due to its instability, there are no permeation tubes or standard gases for HONO available and it must be produced in situ. Therefore, to calibrate gas phase mixing of HONO such a compact and easy deployable source is of interest for the atmospheric chemistry community. The study is well performed and the manuscript well written. Therefore, I support publication after considering the minor comments given below.

General comments:

As surfaces are unavoidable in laboratory setups, the role of surface reactions should be discussed. Although I guess that HONO formation from NO2 impurities is not of importance, there are also heterogeneous decomposition reactions for HONO that form NO (and NO2) and might therefore important to keep impurities low. See esp. (Finlayson-Pitts et al., 2003).

Regarding the FTIR measurements: Can the authors provide more details about the reference spectrum used for HONO (spectrum of cis or trans isomer or total spectrum? taken at which temperature?). The spectral features will change with temperature as the amounts of cis and trans isomers of HONO change with temperature (e.g. Barney et al., 2000). Furthermore, please provide temperature and humidity values of the gas stream if possible.

Specific comment:

L88: Why diluting with 20 mL min-1 flow of oxygen?

References:

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