

Atmos. Meas. Tech. Discuss., referee comment RC3
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Comment on amt-2022-110

Anonymous Referee #3

Referee comment on "Characterization of inexpensive metal oxide sensor performance for trace methane detection" by Daniel Furuta et al., Atmos. Meas. Tech. Discuss.,
<https://doi.org/10.5194/amt-2022-110-RC3>, 2022

The manuscript discusses the performance of 5 off the shelf MOx sensors for methane. The manuscript fits the scope of the journal and is overall well written. Some aspects could benefit from clarifications and context.

It is not very clear why the test conditions with a concentration range between 2 and 10 ppm were chosen as this is way higher than ambient but lower than serious leaks. Also at the end you discuss applicability. So one wonders why this was chosen up front?

The manuscript should have a clear conclusions section for AMT, different from the discussion section.

In the discussion to other studies it is not always clear how the calibration/regression in the current study differs from other studies. This could be useful to specify.

Some figures are unclear especially figure 7. What humidity is shown as <1% and >2%? What is shown there. Other comments below.

Details

Table headers are normally on top of the tables not under

Table 1 can you use similar performance metrics? And if similar performance metrics do not exist in the papers, may be you could use this as an additional justification of your paper?

Table 2, can you please add a date on when the price data was gathered.... Please also specify what is meant with "fast response" and "filtered" (not really explained in the text).

In the discussion of the poor performance of TGS 2602 (and to an extent TGS 2600) it should be made clearer that these are NOT methane sensors.. it is mentioned later but at times they just look like poor performing sensors which is a little unfair to them.

Figure 1: could you improve it so that you see where the reference analyzer samples form relative to the PCB? Also do you have some basic data such as residence time in your chamber. Not critical but would make for a better description. Also inlet air is lab air? Or zero air? I assume lab air because of the RH issue?

The RH variability is bothersome to me. The changes in RH are substantial over short periods of time. The explanation of lab air variability seems very odd as a 10% RH variability 3 times over 1 hour is just odd (fig 2). It would be useful to strengthen this discussion. That data looks like a flow or sensor issues especially seeing how regular it is more than any real room RH variability

Figure 1 : A,B,C,D and E on the PCB are hard to see.

Table 3 and when discussing RMSE can you please remind people of the range of values this is based upon

Figure 3 legend: please format the formulas with subscript.

Figure 4 has a poorer resolution than other figures and seems to have some lines to the left? And between first and second column of panels

Figure 5 and 7. please format chemical formulas as formulas (subscript 4)

Figure 7 and the humidity. I am confused on what is shown here <1% or >2% what "humidity" is that?