

## ***Interactive comment on “Water Vapor Inhibits Hydrogen Sulfide Detection in Pulsed Fluorescence Sulfur Monitors” by Anders B. Bluhme et al.***

### **Anonymous Referee #2**

Received and published: 11 April 2016

General comments: This paper reported an interesting and important issue of H<sub>2</sub>S measurement using the pulsed fluorescence technology. The findings of the paper reveal a possible under-estimation of true H<sub>2</sub>S concentrations in some previous research using this type of H<sub>2</sub>S analyzers. However, the paper should be improved and a careful check to correct some errors in it is necessary.

Title: The word “inhibit” appears in the paper more as “interfere”. It is not consistent as what is described in the research.

Line 2 and throughout the manuscript: Normally, a sentence should not be started with an abbreviation or a chemical formula.

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Line 4 and throughout the manuscript: The “e.g.” should usually followed by a “,” as in “e.g.,”.

Line 23: A more representative publication for the National Air Emissions Monitoring Study is: Heber, A.J., B.W. Bogan, J.-Q. Ni, T.-T. Lim, E.L. Cortus, J.C. Ramirez-Dorransoro, C.A. Diehl, S.M. Hanni, C. Xiao, K.D. Casey, C.A. Gooch, L.D. Jacobson, J.A. Koziel, F.M. Mitloehner, P.M. Ndegwa, W.P. Robarge, L. Wang, and R. Zhang. 2008. The National Air Emissions Monitoring Study: overview of barn sources. In: The Eighth International Livestock Environment Symposium (ILES VIII). Iguassu Falls, Brazil, September 1-5: St. Joseph, Mich.: ASABE.

Line 25: “proposed by” should be “approved by”.

Line 65: Explain about “technical air”. “. . .a 100 ppm H<sub>2</sub>S bottle”; in Table 1, it is 101 ppm.

Lines 66 to 70: Make the names and verbs in the text the same as used in the Figure. It is difficult to follow your description as it is now when referring the figure.

. . .mixture before continuing. Part of the diluted H<sub>2</sub>S stream was lead through a Perma Pure “Nafion dryer” by the 450, while the rest was “bled” into a “fume hood”, avoiding overpressure on the sampling line. The “Nafion dryer” was used to humidify the “dry test gas”, by allowing water to permeate the Nafion membrane from a “humid purge gas”.

Line 76: “H<sub>2</sub>S concentration”, not “H<sub>2</sub>S content”.

Line 88: Do not cut the sentence by a Figure and a Table.

Lines 103 and 116: What does “Already at a relative humidity of 5.3 %,” mean? Does it mean “As low as at 5.3 % relative humidity”?

Line 113: “. . . when measuring SO<sub>2</sub>” or “. . . when measuring H<sub>2</sub>S”?

Line 123: Should be “approved by”.

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Lines 137 to 138: “. . .using a Nafion dryer or another appropriate drying technique.” Was it tested? If not, it should not be as a conclusion.

References: Please carefully check the format and correctness of the cited references. Some examples are:

Lines 145 and 156: Not the correct journal names. Format the article titles consistently with other titles.

Line 155: What is the source of this publication?

April 10, 2016 Comments

1. There appeared to be a critical experimental design or calculation issue that could invalidate the conclusions of the study.

As shown in Figure 2, the concentrations of H<sub>2</sub>S determined by MFCs 2 and 3 for dry samples were used as “baseline” concentrations. However, when the dry sample air passed through the Nafion Humidifier (should be marked something like “Nafion dryer used as humidifier” to agree with the description or “Nafion dryer” in Table 1), the mass of water vapor was added to the mass of mixed dry air and H<sub>2</sub>S. This process could decrease the mass concentrations of H<sub>2</sub>S in the “Sample out” to the analyzer. It should be explained and considered in the study.

2. Lines 109 – 110: “A similar experiment was conducted with SO<sub>2</sub> instead of H<sub>2</sub>S, and no interference from water was observed.” The results of the SO<sub>2</sub> tests are better to be presented for comparison.

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Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2015-357, 2016.

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