**Reply to Reviewer 2**

The authors would like to thank the reviewer for the positive feedback and for the constructive questions and suggestions.

Please find below the answer to the single points.

1) There is an approach which detect all parameter of interferences simultaneously on the solid phase absorbance detection for gas analysis. This may be cited.  (Analytical Chemistry, 81, 4183-4191 (2019).)

**The authors thank the reviewer very much for this interesting paper. We have added the citation to the paper.**

2) It is not clear about the temperature. Is this for sample gas, sensor , or whole system include sample gas?

**The temperature mentioned in the paper refers to the gas temperature. The text has been updated to make it clearer.**

3) Relative humidity may also be effects to the response. Did you concern about RH effects?

**This is a very interesting point, but in this work the authors have not looked at RH effects. All the experiments were performed mixing dry air and nitrogen. The H2O concertation in dry air is according to the supplier below 2 ppm.**

4) "AE" is described in the main text.  But it was not explained in figure caption. It is better the figure can be understand separately.

**Thank you for noticing this. We have updated the captions to include a short explanation.**

5) It is better to put the basic sensor performance after the optimization. LODs, reproducibility, and response speed?

**The authors have developed the new metric described in the paper (Error Limited Accuracy) precisely to quantify the accuracy of the sensor after the optimization (the training). The LOD was not explicitly tested since was not the main focus of the work. Limiting factors for the LOD are not the neural network model but rather the sensitivity of the spot used in this work (Pt-TFPP) which is more sensitive in the entire range relevant for bio applications (Figure 2 of the paper), and the gas mixing device which is currently designed for the range 1% air (saturation) or equivalently 0.2% O2 to 100% air or 20 % O2.**

**It should not be forgotten that all the results shown in the paper have been obtained by a very big number of measurements and therefore when we discuss the distributions of results, we discuss exactly reproducibility (by discussing how wide are the distributions of the results for the AE). Since we don’t have any information on the functional form of the distributions, we decided to give the worst possible results (by giving the maximum value of the Absolute Error in the distributions) instead of only the standard deviation.**

**The response time is due to the sum of the measurement time and the time needed by the algorithm: the measurement time for 50 frequencies is below 1 minute (depends from the electronic and was not optimized here), the time needed by the algorithm is of the order of milliseconds on a modern computer. We have added some information in the text to make the above mentioned points clearer.**

6) Also the sensor resolution on the concentration should be shown. Because the tiny difference of the response by temperature was discussed.

**The sensor resolution, described in this paper by the new metric Error Limited Accuracy, is always better than the value $\bar AE$ as described in the paper (at line 151). This value is the highest possible error considering all the temperatures and oxygen concentrations used. It is possible that the sensor resolutions is higher in certain ranges of the oxygen concentration but this was not studied. We have modified the paper to make this point clearer.**