Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2017-267-RC2, 2017

Atmospheric Measurement Techniques Discussions

Interactive comment on "Standard source of atmospheric black carbon aerosol generated from ultrasonic spray of BC suspension" *by* Ruchen Zhu et al.

Anonymous Referee #2

Received and published: 28 November 2017

Summary:

In this work, the authors use an ultrasonic nozzle to generate black carbon aerosol (BC) from a pH-controlled, surfactant-containing, water-alcohol suspension. An aerosol stream from the ultrasonic nozzle was mixed with zero air in a 2-L chamber and then collected on nylon and Teflon filters for 20-h or analyzed with a Multi-Angle Absorption Photometer (MAAP) after 25 minutes. Mass difference between aerosol-laden filters and blank filters exhibit a linear relationship with a theoretically-derived BC concentration. Interestingly, the mass experiment membrane mass difference is higher than the theoretical mass difference. MAAP results are also linear, but similarily higher than the

theoretical mass difference.

As currently written, this paper exhibits a clear lack of substantial results and also contains excessive formal deficiencies. The foremost of these are outlined below, with the reviewer's suggestions to address them. As addressing comments may cause a major re-working of the paper, only major comments are included in this work.

Major Comments:

1. Currently, this manuscript does not fit within the scope of Atmospheric Measurement Techniques (AMT). Manuscripts in AMT report new developments, significant advances, or novel aspects of laboratory measurement techniques. As written, it is unclear if this technique is novel and, if so, what are its advantages over the four methods summarized in the introduction of the paper. The reviewer is especially interested in its advantages over discharge generators and inverted-burners, which make black carbon in-situ and without any additional water or surfactants. Similarly, what is the advantage of this particular setup over other methods that atomize liquid solutions described in the last paragraph of the introduction?

2. Both the mass-difference and MAAP results are above their theoretical estimations. This suggests that an additional calibration is needed with this technique to get quantitative results. The reviewer would guess that the experimental results would be below the theoretical estimations due to losses in the mixing-chamber and experimental setup. Do the authors have an explanation as to why both techniques give higher results? Consequently, do the authors also have a recommendation for the field on how this technique can be used "directly as a standard source" given that the results do not quantitatively match their theoretical estimations?

3. Given that the two above major comments can be addressed, the reviewer suggests that the authors pay special attention to correct word choice and grammar in the next revision. For example, in the abstract alone, the reviewer notes that the phrase "check up its feasibility" is grammatically incorrect, and the phrase "good feasibility in

the BC concentrations range" is grammatically vague due to word choice. This persists throughout the paper. Furthermore, the paper contains several instances where incomplete sentences are intentionally used. These include the Reagents and Instruments sections, Table Headings, and Figure Captions. While it may be appropriate in other fields to use incomplete sentences in these instances, it is generally not commonplace in Atmospheric Science journals; the reviewer suggests that the authors amend these sections.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-267, 2017.