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## ***Interactive comment on “Soot Reference Materials for instrument calibration and intercomparisons: a workshop summary with recommendations” by D. Baumgardner et al.***

**Anonymous Referee #2**

Received and published: 7 May 2012

Review of amt-2012-45

This MS is certainly a valuable contribution to the discussion on EC/BC/OC measurements, and contains valuable recommendations. I therefore recommend its eventual publication, but there are several points that should be addressed before a final publication.

The MS summarizes discussions during a workshop and therefore is not a typical scientific paper. It is listed as “review” paper, but due to its origin it is not a typical review, either. I strongly recommend to expand the review aspects on the one hand by careful referencing, and to clearly differentiate between review and recommendations on the

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other.

The recommendation in section 4.1.2 (the manufacturer of the SP2 instrument should provide well characterized fullerene soot to SP2 users; manufacturer should keep a database of results from instrument intercomparison studies) go far beyond the reach of both a review and a scientific paper.

The main weakness of some sections of the MS is the partial lack of references in the text. Some sections certainly have adequate references but others do not. Figure 1 seems to be new material, as no reference is given on p 2324. Near the end of the MS (p 2345) the text indicates that Figure 1 originates from Subramanian et al. 2006. Throughout the discussion of problems of the OC/EC split in thermal methods, valid points are summarized but without proper referencing. Many of the arguments can be found in earlier papers, e.g. the excellent discussion of the issues concerning thermal protocols one by Cavalli et al. 2010 (referenced in this MS), where proper references are given.

The use of italics is confusing. In the introduction, the text states that “sections written in italics indicate material that might not reflect 100% agreement of the participants”. This is strange in itself – why include things that not all co-authors can agree to? Or do the co-authors agree, but not the workshop participants? These text sections should either be completely removed or reworded as open questions. This is even more important as the recommendations are also given in italics. Does this mean that not all co-authors agree to the recommendations?

#### Minor points

p 2324, lines 24/25: “light absorbing particles convert the absorbed photons to heat and raise the temperature of the surrounding environment” should be reworded. Photons cannot really be “converted” to heat – their energy is absorbed and increases the internal energy of the particles, which of course means an increase in particle temperature.

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p 2325, line 1: change “magnitude of this wave” to “amplitude of this wave”

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p 2325, line 8: insert “at the ground” between “solar radiance” and “is at its maximum”. The sentence “532 nm, the wavelength where the solar radiance is at its maximum” implies that the maximum of the solar radiance indeed is at 532 nm. Actually the maximum of the extraterrestrial solar radiation is below 500 nm.  
<http://rredc.nrel.gov/solar/spectra/am0/>

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p 2325, line 12: add reference

p 2327, line 2: add reference and specific materials used

p 2327, second and fourth calibration issues: there seems to be a contradiction between these two issues?

p 2328, line 11, reference to book by Seager and Slabaugh: page numbers would be helpful in references to books

p 2329, line 6: add reference for the enthalpies of sublimation

p 2329, line 17 ff: give reference for the semi-continuous Sunset Analyzer

p 2330, line 19: the Sunset lab instruments always inject a calibration amount of CH<sub>4</sub> at the end of each analysis cycle

p 2331, paragraph starting line 12: add references discussing the effect of removal of WSOC by washing procedures

p 2332, lines 20/21: “a single RM cannot be used for both calibration and validation of results in the same measurement procedure”: please give reason

p 2335, line 14. “used to exercise a sensor in an instrument”: please clarify what is meant by “exercise”

p 2337, line 5: “significant variability, compared to the photoacoustic reference materials”: please quantify

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p 2337, Boulder Light Absorbing Carbon experiment: please provide reference, or, if this is not yet available, at least names and contact info of PIs

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p 2339, line 25: change “Kirschstetter” to “Kirchstetter”

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p 2349, line 1: add reference for the CAST soot generator

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p 2349, line 9: add reference to the Palas GFG spark discharge aerosol generator

p 2349, paragraph starting line 14: has this “tailored material” been tested? If yes, add reference. If no, please declare that is has not.

p 2350, line 2: “the tailored soot . . . can be placed directly in the oven of a TOA instrument, on a clean quartz substrate, thereby avoiding issues associated with contaminated filters” – how can this be done so that a transmission (or reflection) measurement is still possible?

p 2343, line 24, figure 5: this figure seems to have been taken from Laborde et al. 2012a - has permission been obtained for reproduction?

p 2346, last par: the discussion of the influence of carbonate carbon comes quite late in the MS, and should not be relegated to a recommendation section. Jankowski et al. 2008 not only mention CC interference, they provide a method to quantify CC. The MS states here that the question of CC has not been assessed.

p 2347, last par: give references also here for the “community of SP2 users” and the “similar group who use filter based instruments”

p 2348, lines 4ff: “strong need for a working group” – there is already a working group located at CEN

text: check spelling of “Virkkula” – there are several versions of this name

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Interactive comment on Atmos. Meas. Tech. Discuss., 5, 2315, 2012.

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