

Comment on “Technical Note: The single particle soot photometer fails to detect PALAS soot nanoparticles” by M. Gysel et al.

Anonymous Referee #1

In this publication, the authors describe their finding that the SP2 fails to detect spark-generated soot. The authors explain their finding by the morphology of the PALAS soot particles which behave like “the sum of very small individual primary particles” in the SP2’s laser. This is an interesting result worth publishing. The experiments are well described and the paper is well written.

After addressing the following minor points, I recommend this paper for publication:

General comments:

I personally would recommend not to use so many acronyms (e.g. LDL, LII etc.) because those acronyms make it difficult to read the text.

Are aged PALAS-soot particles detectable with the SP2? It would be interesting to perform additional lab tests in order to proof the explanation suggested by the authors. However, I am not sure whether such tests are beyond the scope of this study. During such additional tests, the authors could send spark-generated soot particles through a thermal denuder or through high relative humidity in order to collapse the fractal structure of the particles. Is the SP2 after this treatment able to detect the PALAS soot particles?

Do the authors have SEM/TEM images of the spark-generated soot which is not detected by the SP2? If so, it would be helpful to show those images in this publication.

Specific comments:

p. 4908, l. 15: For which reason did the authors use two bipolar chargers?

p. 4910, l.8/9: „The DMA and the APM were operated at sufficiently high resolution such that V_{peak} was not biased by the influence of doubly charged particles.“ → Could you please give a little bit more detail (e.g. what is “high resolution”)?

p. 4910/4911: How do the settings of the PALAS soot generator impact the particle morphology?

p. 4915, l. 19ff: Explain fractal dimensions and the meaning of these numbers.

p.4916, l. 13: The authors mention biomass burning aerosol but they do not further discuss it. Either more discussion on detectability of biomass burning particles is given, otherwise the authors should not refer to biomass burning particles.