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Atmospheric Measurement Techniques Discussions

Interactive comment on "Effect of secondary organic aerosol coating thickness on the real-time detection and characterization of biomass burning soot by two particle mass spectrometers" *by* Adam T. Ahern et al.

J. C. Corbin (Referee)

joel.corbin@psi.ch

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In the Conclusions, the authors state *contrary to Corbin et al. (2014), we did not observe the characteristic fullerene-rich signal they previously reported for fuel-rich combustion.* As an author of that study – and not as a reviewer – I would like to take the opportunity to comment publicly on the nature of those fuel-rich combustion samples.

After Corbin et al. (2014) was published, a paper by Maricq (2014) appeared where particles produced by a CAST burner were studied by mass spectrometry. Maricq

operated his CAST burner in a manner that is considered comparable to our study, and his results indicated that the composition of the fuel-rich CAST burner soot was representative of a quenched combustion, such that soot graphitization reactions were frozen prior to the formation of normal flame soot.

Therefore, we now do not consider the "fuel-rich" CAST samples to be representative of fuel-rich combustion as relevant to biomass-burning, since it seems that the quenched flame, rather than the fuel-to-oxygen ratio, was essential in controlling that sample's composition. In contrast, the results of Maricq support the view that the fuel-lean sample of Corbin et al. (2014) is representative to typical flame soot BC. Nevertheless, BC particles dissimilar from flame soot might still be relevant to atmospheric science (Fortner et al., 2012).

Reference:

Fortner, E. C., et al. Particulate emissions measured during the TCEQ comprehensive flare emission study. Industrial & Engineering Chemistry Research 51.39 (2012): 12586-12592.

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