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Interactive comment on "Are black carbon and soot the same?" *by* P. R. Buseck et al.

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I have a comment about the following statement in the paper:

Elemental carbon (EC) is another term used in the aerosol community. It is essentially a high-T residue of thermal-optical measurements. EC is commonly measured together with organic carbon (OC), with the latter being the low-T fraction (Table 1).

This statement is only true for those that use EC measured with thermal-optical techniques. There are others that use single particle mass spectrometers that describe particles as EC which produce a characteristic mass spectrum with mainly C cluster ion peaks. This forms a true chemical structure which goes well beyond an instrumental definition. EC is another form of carbon with mostly sp2 hybridized bonds in sheets (like graphite but more disrupted with sp3 bonds as well). The EC particles qualify as soot also but we use the term EC as it has an actual link to a real chemical structure.

We have written many papers with EC described as such ($\sim$50) but none of these are even mentioned or cited. The point of this paper is to add another label – yet I do not say any reason EC or soot cannot still apply. It is true, as the authors point out, that EC is being applied rather loosely by the folks that use thermal optical techniques. But it is also a real structure of mostly carbon.

Several relevant papers which describe the mass spectra of soot or EC particles are listed below. There are many other groups using single particle mass spectrometers that also label mass spectra with carbon clusters as soot. This entire body of literature has been missed in the discussion in the paper.

Noble, C. A. and K. A. Prather (1996). "Real-time measurement of correlated size and composition profiles of individual atmospheric aerosol particles." Environmental Science & Technology 30(9): 2667-2680.

Shields, L. G., D. T. Suess and K. A. Prather (2007). "Determination of single particle mass spectral signatures from heavy-duty diesel vehicle emissions for PM2.5 source apportionment." Atmospheric Environment 41(18): 3841-3852.

Spencer, M. T. and K. A. Prather (2006). "Using ATOFMS to determine OC/EC mass fractions in particles." Aerosol Science and Technology 40(8): 585-594.

Spencer, M. T., L. G. Shields and K. A. Prather (2007). "Simultaneous measurement of the effective density and chemical composition of ambient aerosol particles." Environmental Science & Technology 41(4): 1303-1309.

Toner, S. M., D. A. Sodeman and K. A. Prather (2006). "Single Particle Characterization of Ultrafine and Accumulation Mode Particles from Heavy Duty Diesel Vehicles Using Aerosol Time-of-Flight Mass Spectrometry." Environmental Science & Technology 40(12): 3912-3921.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 24821, 2012.