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Atmospheric Chemistry and Physics
Discussions

Interactive comment on "Light absorption properties of laboratory generated tar ball particles" *by* A. Hoffer et al.

Anonymous Referee #1

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This is a very interesting paper describing laboratory work related to atmospheric tar balls (TB) and brown carbon (BrC). Specifically, the authors use dry distillation of wood to create aqueous and oily extracts, which, after dilution in methanol, are nebulized and extensively characterized. Findings include that these laboratory generated TB are similar in character to atmospheric TB. This confirms an alternative production method for a surrogate for atmospheric TB and BrC. This manuscript should be published in ACP (or AMT) after taking the following comments into account.

1. Not sure if this manuscript should go into ACP or AMT as it describes the production and characterization of an aerosol surrogate for TB and BrC.

2. The manuscript tries to distinguish itself, in my opinion excessively, from previous

work by stating (e.g., P. 16216 L. 6-7; abstract and P.16217 L. 20-21; introduction) that "their [TB] absorption properties have been only indirectly inferred from field observations or calculations based on their electron energy-loss spectra [EELS]". I don't see a difference of "directness" between the method of this work and that of Chakrabarty et al. (2010) that is discussed in this manuscript. Chakrabarty et al. (2010) generate TB through smoldering laboratory combustion, characterize absorption, scattering, and size distribution and obtain complex refractive indices from inversion of these data. Very similar to this manuscript with the exception of the TB production method and the fact that Chakrabarty et al. (2010) use a more direct absorption measurement (photoacoustic), thereby excluding interferences from filter substrates. I'd also be a bit more critical of the results of Alexander et al. (2008) as EELS is not constrained by the same transition selection rules as optical spectroscopy and may therefore yield different results.

3. P.16217 L.8-9; introduction: "Their sizes range from 30 to 500 nm in optical diameter as determined by TEM." Unclear how TEM can determine "optical diameter", I thought this would be done by optical methods yielding scattering, absorption, and extinction cross-sections and perhaps diameters for spherical particles. TEM diameters should maybe be characterized as projected area and geometric diameter.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 16215, 2015.