Atmospheric
Chemistry
and Physics
Discussions

Interactive comment on "Determination of the refractive index of insoluble organic extracts from atmospheric aerosol over the visible wavelength range using optical tweezers" *by* Rosalie H. Shepherd et al.

Anonymous Referee #1

Received and published: 11 September 2017

Interesting experimental work dealing with the characterization of aerosol particles where the imaginary part of the refractive index cannot be neglected.

Questions/comments that should be addressed:

1. To echo what the other two reviewers stated: It seems like some important references regarding the determination of the refractive index of single aerosol particles using Mie theory are missing from the introduction.

2. Were the Mie spectra calculated by integrating over the acceptance angle of the

objective? Please add a sentence or two that qualitatively describes the calculation. On page 3 it is stated "simulating the spectrum with Mie calculations." That is too vague.

3. Can you provide more details on how the size and Cauchy parameters were found. A simple grid search? If so, over what space? Was the imaginary part of the refractive index included in the search space?

4. In Section 4.4, the uncertainty associated with fitting less structured Mie spectra is mentioned. What is the origin of this increased uncertainty when fitting Mie spectra of absorbing particles or submicron particles studied at optical wavelengths? Presumably, Mie theory allows you to calculate the observed spectrum very accurately. Yet, when sharp peaks are absent, the uncertainty in the retrieved parameters increases substantially. A thorough answer to this question is not necessary but a slightly more detailed comment in the text would be helpful.