

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.

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Reply in the PDF file:-

Please also note the supplement to this comment:

<https://www.atmos-chem-phys-discuss.net/acp-2017-693/acp-2017-693-AC1-supplement.pdf>

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-693>,

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Reply to 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 #2

In this manuscript, Shepherd et al. present an optical trapping technique combined with white light spectroscopy to measure the real and imaginary parts of the refractive index for samples of insoluble material from ambient aerosol samples. They use the data to estimate the effects of organic film-coated particles in the atmosphere revealing significant changes in the top of the atmosphere albedo compared to an assumption of equal sized water droplets. This work is interesting and relevant and should be published once the following minor points are clarified or addressed:

Thank you.

1. In the introduction, references to the work of Reid and coworkers on refractive index measurements should be included.

The following references have been added:-

R.E.H. Miles, J.S. Walker, D.R. Burnham and J.P. Reid, 'Retrieval of the Complex Refractive Index of Aerosol Droplets from Optical Tweezers Measurements', Physical Chemistry Chemical Physics 14 (2012) 3037–3047.

H.-B. Lin, J.D. Eversole, A.J. Campillo, "Identification of morphology dependent resonances in stimulated Raman scattering from microdroplets", Optics Communications, 77(5,6) (1990) 407-410

With the following text added to the paper:

"The use of morphological dependent resonances in Raman Spectra to determine refractive index at a fixed wavelength has been reported by Lin et al. (1990) and references therein and Miles et al. (2012)."

2. The statement of an "unparalleled level of accuracy" seems too strong given the much greater precision and accuracy achievable using cavity-enhanced Raman scattering in optical tweezers.

The statement has been removed and the text now reads:

"Application of the optical trapping technique was successfully employed to determine the refractive index of aerosol over a wide wavelength range".

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Fig. 1.